REPORT

OF THE

SEVENTEENTH ANNUAL MEETING

OF THE

American Street Railway Association

HELD IN

MECHANICS' HALL, BOSTON, MASS.
SEPTEMBER 6-9, 1898

Mr. ALBION E. LANG
President, Toledo Traction Company, Toledo, Ohio
PRESIDENT

Association Organized December 13, 1882

1898-1899

OFFICE OF THE ASSOCIATION
2020 STATE STREET, CHICAGO

PETTIBONE SAWTELL & CO. PRINTERS CHICAGO

Albion E. Lang

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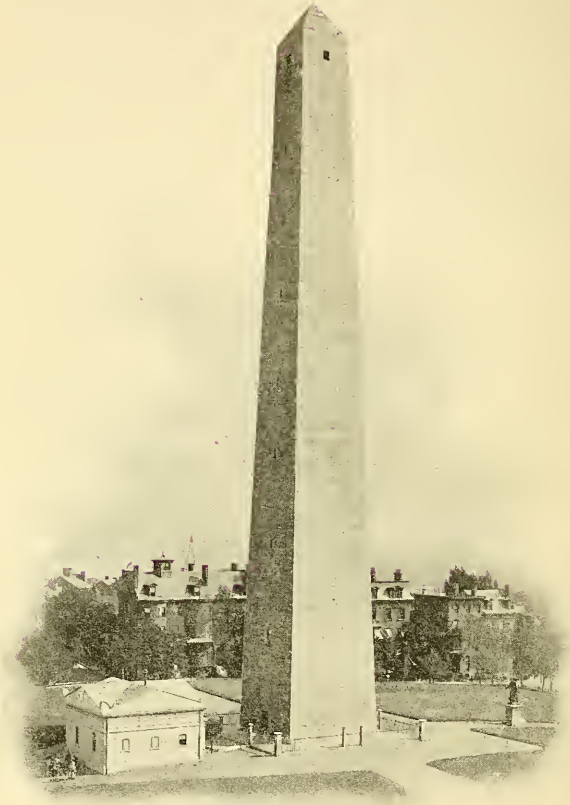

BOSTON, 1898

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BANQUET.

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PRESIDENT:

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Boston, Mass.

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HENRY C. MOORE,

President Trenton Street Railway Co.,
Trenton, N. J.

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THIRD VICE-PRESIDENT:

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Vice-President and General Manager Metropolitan Street Railway Co.,
Kansas City, Mo.

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Treasurer Chicago City Railway Co.,
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PLACE OF MEETING, CHICAGO, ILL.

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SECRETARIES:

CHAUNCEY C. WOODWORTH,

Secretary, Rochester City and Brighton Railroad Company, Rochester, N. Y.

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President, Oakwood and Dayton Street Railway Companies, Dayton, O.

PLACE OF MEETING, BOSTON, MASS.

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OFFICERS, 1882-'83.

PRESIDENT:

H. H. LITTELL,

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FIRST VICE-PRESIDENT:

WILLIAM H. HAZZARD,

President, Brooklyn City Railroad Company, Brooklyn, N. Y.

SECOND VICE-PRESIDENT:

CALVIN A. RICHARDS,

President, Metropolitan Railroad Company, Boston, Mass.

THIRD VICE-PRESIDENT:

GEORGE B. KERPER,

President, Mount Adams and Eden Park Inclined Railway, Cincinnati, O.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
JULIUS S. WALSH, Pres., Citizens' Railway Co., St. Louis, Mo.
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THOMAS LOWRY, Pres., Minneapolis Street Railway Co., Minneapolis, Minn.
JAMES K. LAKE, Supt., Chicago West Division Railway, Chicago, Ill.
DANIEL F. LONGSTREET, Gen. Man., Union Railroad Co., Providence, R. I.

PLACE OF MEETING, CHICAGO, ILL.

OFFICERS, 1883-'84.

PRESIDENT:

WILLIAM H. HAZZARD,

President, Brooklyn City Railroad Company, Brooklyn, N. Y.

FIRST VICE-PRESIDENT:

JAMES K. LAKE,

Superintendent, Chicago West Division Railway, Chicago, Ill.

SECOND VICE-PRESIDENT:

GEORGE B. KERPER,

President, Mt. Adams and Eden Park Inclined Railway, Cincinnati, O.

THIRD VICE-PRESIDENT:

DANIEL F. LONGSTREET,

General Manager, Union Railroad Co., Providence, R. I.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
H. H. LITTELL, Gen. Man., Louisville City Railway Co., Louisville, Ky.
JOHN G. HOLMES, Pres., Citizens' Street Railroad Co., Pittsburgh, Pa.
JULIUS E. RUGG, Supt., Highland Street Railroad, Boston, Mass.
PIERRE C. MAFFITT, Pres., Missouri Railroad Co., St. Louis, Mo.
JACOB SHARP, Pres., Twenty-third Street Railway Co., New York, N. Y.

PLACE OF MEETING, NEW YORK, N. Y.

OFFICERS, 1884-'85.

PRESIDENT:

CALVIN A. RICHARDS,

President, Metropolitan Railroad Company, Boston, Mass.

FIRST VICE-PRESIDENT:

JULIUS S. WALSH,

President, Citizens' Railway Company, St. Louis, Mo.

SECOND VICE-PRESIDENT:

HENRY M. WATSON,

President, Buffalo Street Railroad Company, Buffalo, N. Y.

THIRD VICE-PRESIDENT:

EDWARD LUSHER,

Sec. and Treas., Montreal City Passenger Railway Company, Montreal, Can.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
WILLIAM H. HAZZARD, Pres., Brooklyn City Railroad Co., Brooklyn, N. Y.
JAMES K. LAKE, Supt., Chicago West Division Railway, Chicago, Ill.
CHARLES J. HARRAH, Pres., People's Passenger Railway Co., Philadelphia, Pa.
WILLIAM WHITE, Pres., Dry Dock, E. Broadway & B. Railroad Co., New York, N. Y.
B. DU PONT, Pres., Central Passenger Railroad Co., Louisville, Ky.

PLACE OF MEETING, ST. LOUIS, MO.

OFFICERS, 1885-'86.

PRESIDENT:

JULIUS S. WALSH,

President, Citizens' Railway Company, St. Louis, Mo.

FIRST VICE-PRESIDENT:

WILLIAM WHITE,

President, Dry Dock, E. Broadway & B. Railroad Company, New York, N. Y.

SECOND VICE-PRESIDENT:

CHARLES B. HOLMES,

President, Chicago City Railway Company, Chicago, Ill.

THIRD VICE-PRESIDENT:

SAMUEL LITTLE,

Treasurer, Highland Street Railway Company, Boston, Mass.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
CALVIN A. RICHARDS, Pres., Metropolitan Railroad Co., Boston, Mass.
JOHN KILGOUR, Pres., Cincinnati Street Railway Co., Cincinnati, O.
JOHN MAGUIRE, Pres., City Railroad Co., Mobile, Ala.
THOMAS W. ACKLEY, Pres., 13th and 15th Streets Pass. Railway Co., Philadelphia, Pa.
CHAUNCEY C. WOODWORTH, Sec., Rochester City & B. Railroad Co., Rochester, N. Y.

PLACE OF MEETING, CINCINNATI, O.

OFFICERS, 1886-'87.

PRESIDENT:

THOMAS W. ACKLEY,

President, 13th and 15th Streets Passenger Railway Company, Philadelphia, Pa.

FIRST VICE-PRESIDENT:

ALBERT G. CLARK,

Vice-President, Cincinnati Street Railway Company, Cincinnati, O.

SECOND VICE-PRESIDENT:

WILLIAM H. SINCLAIR,

President, Galveston City Railroad Company, Galveston, Tex.

THIRD VICE-PRESIDENT:

PRENTISS CUMMINGS,

President, Cambridge Railroad Company, Cambridge, Mass.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
JULIUS S. WALSH, Pres., Citizens' Railway Co., St. Louis, Mo.
HENRY HURT, Pres., Washington and Georgetown Railroad Co., Washington, D. C.
C. DENSMORE WYMAN, Vice-Pres., Central Park, N. & E. River Railroad Co., N. Y.
A. EVERETT, Pres., East Cleveland Railroad Co., Cleveland, O.
SAMUEL S. SPAULDING, Pres., East Side Street Railroad Co., Buffalo, N. Y.

PLACE OF MEETING, PHILADELPHIA, PA.

OFFICERS, 1887-'88.

PRESIDENT:

CHARLES B. HOLMES,

President, Chicago City Railway Company, Chicago, Ill.

FIRST VICE-PRESIDENT:

JULIUS E. RUGG,

General Superintendent, Boston Consolidated Street Railway, Boston, Mass.

SECOND VICE-PRESIDENT:

R. DUDLEY FRAYSER,

President, Memphis City Railway Company, Memphis, Tenn.

THIRD VICE-PRESIDENT:

CHARLES B. CLEGG,

Director, Dayton Street Railroad Company, Dayton, O.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
THOMAS W. ACKLEY, Pres., 13th and 15th Streets Pass. Railway Co., Philadelphia, Pa.
WINFIELD SMITH, Pres., Cream City Railroad Co., Milwaukee, Wis.
DANIEL F. LEWIS, Pres., Brooklyn City Railroad Co., Brooklyn, N. Y.
CHARLES GREEN, Pres., People's Railway Co., St. Louis, Mo.
EDWARD G. MOSHER, Supt., Augusta and Summerville Railroad, Augusta, Ga.

PLACE OF MEETING, WASHINGTON, D. C.

OFFICERS, 1888-'89.

PRESIDENT:

GEORGE B. KERPER,

President, Mount Adams and Eden Park Inclined Railway, Cincinnati, O.

FIRST VICE-PRESIDENT:

JESSE METCALF,

President, Union Railroad Company, Providence, R. I.

SECOND VICE-PRESIDENT:

HENRY HURT,

President, Washington and Georgetown Railroad Company, Washington, D. C.

THIRD VICE-PRESIDENT:

WILLIAM H. MARTIN,

Vice-President, Ferries and Cliff House Railway Company, San Francisco, Cal.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
CHARLES B. HOLMES, Pres., Chicago City Railway Co., Chicago, Ill.
JOHN SCULLIN, Pres., Union Depot Railroad Co., St. Louis, Mo.
JAMES H. JOHNSTON, Pres., City and Suburban Railway Co., Savannah, Ga.
HENRY A. SAGE, Pres., Easton, S. Easton & W. E. Pass. Railway Co., Easton, Pa.
EDWARD J. LAWLESS, Supt., Metropolitan Street Railway, Kansas City, Mo.

PLACE OF MEETING, MINNEAPOLIS, MINN.

OFFICERS, 1889-'90.

PRESIDENT:

THOMAS LOWRY,

President, Minneapolis, and St. Paul, Street Railway Companies, Minneapolis, Minn.

FIRST VICE-PRESIDENT:

C. DENSMORE WYMAN,

Vice-President, Central Park, North and East River Railroad Company, New York, N. Y.

SECOND VICE-PRESIDENT:

JOHN C. SHAFFER,

President, Citizens' Street Railroad Company, Indianapolis, Ind.

THIRD VICE-PRESIDENT:

ROBERT McCULLOCH,

General Manager, Citizens', St. Louis, Cass Avenue & Fair Grounds, and Benton-Bellefontaine Railways, St. Louis, Mo.

SECRETARY AND TREASURER:

WILLIAM J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
GEORGE B. KERPER, Pres., Mt. Adams and E. P. Inc. Railway Co., Cincinnati, O.
GEORGE W. KIELY, Man. Dir., Toronto Street Railway Co., Toronto, Canada.
FRANK H. MONKS, Gen. Man., West End Street Railway Co., Boston, Mass.
RAPHAEL SEMMES, Supt., Citizens' Street Railroad, Memphis, Tenn.
FRANCIS M. EPPLEY, Pres., Orange Cross-Town & B. Railway Co., Orange, N. J.

PLACE OF MEETING, BUFFALO, N. Y.

OFFICERS, 1890-'91.

PRESIDENT:

HENRY M. WATSON,

President, Buffalo Street Railroad, and Buffalo East Side Street Railway, Companies, Buffalo, N. Y.

FIRST VICE-PRESIDENT:

WILLIAM A. SMITH,

General Manager, Omaha Street Railway Company, Omaha, Neb.

THIRD VICE-PRESIDENT:

ANDREW D. RODGERS,

President, Columbus Consolidated Street Railroad Company, Columbus, O.

SECOND VICE-PRESIDENT:

CHARLES ODELL,

President, Newburyport & Amesbury Street Railroad Company, Newburyport, Mass.

SECRETARY AND TREASURER:

WM. J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
THOMAS LOWRY, Pres., Minneapolis and St. Paul Street R'y Co's., Minneapolis, Minn.
DAVID F. HENRY, Pres., Federal Street and P. V. Pass. Railway Co., Pittsburg, Pa.
ALBERT E. THORNTON, Dir., Atlanta Street Railroad Co., Atlanta, Ga.
HARVEY M. LITTELL, Gen. Man., Cincinnati Inclined Plane R'y Co., Cincinnati, O.
THOMAS C. KEEFER, Pres., Ottawa City Pass. Railway Co., Ottawa, Canada.

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OFFICERS, 1891-'92.

PRESIDENT:

JOHN G. HOLMES,

President, Citizens' Traction Company, Pittsburgh, Pa.

FIRST VICE-PRESIDENT:

THOMAS H. McLEAN,

Secretary, Twenty-third Street Railway Company, New York, N. Y.

SECOND VICE-PRESIDENT:

JAMES B. SPEED,

President, Louisville City Railway Company, Louisville, Ky.

THIRD VICE-PRESIDENT:

ALBION E. LANG,

Vice-President, Toledo Consolidated Street Railway Company, Toledo, O.

SECRETARY AND TREASURER:

WM. J. RICHARDSON,

Secretary, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS and
HENRY M. WATSON, Pres., Buffalo Railway Co., Buffalo, N. Y.
LEWIS PERRINE, JR., Pres., Trenton Pass. Railway Co. Consolidated, Trenton, N. J.
W. WORTH BEAN, Pres., St. Joseph and Benton Harbor R'y Co., St. Joseph, Mich.
MURRY A. VERNER, Pres., Pittsburgh and Birmingham Traction Co., Pittsburgh, Pa.
THOMAS C. PENINGTON, Treas., Chicago City Railway Co., Chicago.

PLACE OF MEETING, CLEVELAND, O.

OFFICERS, 1892-'93.

PRESIDENT:

D. F. LONGSTREET,

Vice-Pres. and Gen. Man., West End Street Railroad Company, Denver, Col.

FIRST VICE-PRESIDENT:

A. EVERETT,

President, East Cleveland Railroad Company, Cleveland, O.

THIRD VICE-PRESIDENT:

W. WORTH BEAN,

President, St. Joseph & Benton Harbor Electric Ry. Co., St. Joseph, Mich.

SECOND VICE-PRESIDENT:

JOEL HURT,

President, Atlanta Consolidated Street Railroad Company, Atlanta, Ga.

SECRETARY AND TREASURER:

WM. J. RICHARDSON,

Sec. and Treas., Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS AND
JOHN G. HOLMES, Pres., Citizens' Traction Co., Pittsburgh, Pa.
JOHN D. CRIMMINS, Pres., Metropolitan Traction Co., New York, N. Y.
THOMAS J. MINARY, Gen. Man., Louisville Railway Co., Louisville, Ky.
JAMES R. CHAPMAN, Vice-Pres., Consolidated St. Railway Co., Grand Rapids, Mich.
BENJAMIN E. CHARLTON, Pres., Hamilton Street Railway Co., Hamilton, Ont.

PLACE OF MEETING, MILWAUKEE, WIS.

OFFICERS, 1893-'94.

PRESIDENT:

HENRY C. PAYNE,

Vice-President, Milwaukee Street Railway Company, Milwaukee, Wis.

FIRST VICE-PRESIDENT:

WILLIAM J. STEPHENSON,

President, Metropolitan Railroad Company, Washington, D. C.

SECOND VICE-PRESIDENT:

JAMES R. CHAPMAN,

Vice-President, Consolidated Street Railway Company, Grand Rapids, Mich.

THIRD VICE-PRESIDENT:

LEWIS PERRINE, JR.,

President, Trenton Passenger Railway Company, Consolidated, Trenton, N. J.

SECRETARY AND TREASURER:

WM. J. RICHARDSON,

Sec. and Treas., Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS AND
D. F. LONGSTREET, Vice-Pres., West End Street Railway Co., Denver, Col.
THOMAS H. MCLEAN, Gen. Man., Citizens' Street Railroad Co., Indianapolis, Ind.
EDWARDS WHITAKER, Pres., Lindell Railway Co., St. Louis, Mo.
W. Y. SOPER, Pres., Ottawa Electric Street Railway Co., Ottawa, Can.
E. S. GOODRICH, Pres., Hartford Street Railway Co., Hartford, Conn.

PLACE OF MEETING, ATLANTA, GA.

OFFICERS, 1894-'95.

PRESIDENT:

JOEL HURT,

President, Atlanta Consolidated Street Railway Company, Atlanta, Ga.

FIRST VICE-PRESIDENT:

W. WORTH BEAN,

Pres., St. Joseph & Benton Harbor Electric Railway and Light Co., St. Joseph, Mich.

SECOND VICE-PRESIDENT:

JOHN H. CUNNINGHAM,

Director, Lynn and Boston Railroad Company, Boston, Mass.

THIRD VICE-PRESIDENT:

RUSSELL B. HARRISON,

Pres., Terre Haute Street Railway Company, Terre Haute, Ind.

SECRETARY AND TREASURER:

WM. JAMES RICHARDSON,

Director, Atlantic Avenue Railroad Company, Brooklyn, N. Y.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS AND
HENRY C. PAYNE, Vice-Pres., Milwaukee Street Railway Co., Milwaukee, Wis.
WILLIAM H. JACKSON, Pres., Nashville Street Railway, Nashville, Tenn.
D. G. HAMILTON, Pres., Cass Ave. and Fair Grounds Ry. Co. and St. Louis R. R. Co., St. Louis, Mo.
GRANVILLE C. CUNNINGHAM, Man., Montreal Street Railway Co., Montreal, Can.
JOHN N. PARTRIDGE, Pres., Brooklyn City & Newtown Railroad Co., Brooklyn, N. Y.

PLACE OF MEETING, MONTREAL, CANADA.

OFFICERS, 1895-'96.

PRESIDENT:

H. M. LITTELL,

Pres. Atlantic Avenue Railroad Company, Brooklyn, N. Y.

FIRST VICE-PRESIDENT:

GRANVILLE C. CUNNINGHAM,

Man. Montreal Street Railway Company, Montreal, Can.

SECOND VICE-PRESIDENT,

WILLIAM H. JACKSON,

Pres. Nashville Street Railway, Nashville, Tenn.

THIRD VICE-PRESIDENT:

J. WILLARD MORGAN,

Pres. Camden, Gloucester and Woodbury Railroad Company, Camden, N. J.

SECRETARY AND TREASURER:

T. C. PENINGTON,

Treasurer Chicago City Railway Co., Chicago, Ill.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS AND
JOEL HURT, Pres. Atlanta Consolidated Street Railway Co., Atlanta, Ga.
PRENTISS CUMMINGS, Vice-Pres. West End Street Railway Co., Boston, Mass.
C. G. GOODRICH, Vice-Pres. Twin City Railway Co., St. Paul, Minn.
A. MARKLE, Gen. Man. Lehigh Traction Co., Hazleton, Pa.
W. F. KELLY, Gen. Man. Columbus Street Railway Co , Columbus, Ohio.

PLACE OF MEETING, ST. LOUIS, MO.

OFFICERS, 1896-'97.

PRESIDENT:

ROBERT McCULLOCH,

Vice-Pres. and Gen. Man. Citizens', Cass Avenue and St. Louis Railroad Companies, St. Louis, Mo.

FIRST VICE-PRESIDENT:

CHARLES S. SERGEANT,

Gen. Man. West End Street Railway Co., Boston, Mass.

THIRD VICE-PRESIDENT:

C. F. HOLMES,

Gen. Man. Metropolitan Street Railway Co., Kansas City, Mo.

SECOND VICE-PRESIDENT:

D. B. DYER,

Pres. Augusta Railway and Electric Co., Augusta, Ga.

SECRETARY AND TREASURER:

T. C. PENINGTON,

Treas. Chicago City Railway Co., Chicago, Ill.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS AND
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H. P. BRADFORD, Gen. Man. Cincinnati Inclined Plane Railway Co., Cincinnati, Ohio.
CHARLES H. SMITH, Gen. Supt. Troy City Railway Co., Troy, N. Y.
HARRY SCULLIN, Vice-Pres. and Gen. Man. Union Depot Railroad Co., St. Louis, Mo.
GEORGE B. HIPPEE, Gen. Man. Des Moines City Railway Co., Des Moines, Iowa.

PLACE OF MEETING, NIAGARA FALLS, N. Y.

OFFICERS, 1897-'98.

PRESIDENT:

ALBION E. LANG,

President Toledo Traction Co., Toledo, Ohio.

FIRST VICE-PRESIDENT:

W. CARYL ELY,

President Buffalo and Niagara Falls Electric Ry. Co., Niagara Falls, N. Y.

THIRD VICE-PRESIDENT:

EDWARD G. CONNETTE,

Gen. Man. Nashville Street Railway, Nashville, Tenn.

SECOND VICE-PRESIDENT:

JOHN A. RIGG,

President United Traction Co., Reading, Pa.

SECRETARY AND TREASURER:

T. C. PENINGTON,

Treasurer Chicago City Railway Co., Chicago, Ill.

EXECUTIVE COMMITTEE:

PRESIDENT, VICE-PRESIDENTS AND
ROBERT MCCULLOCH, Vice-President and Gen. Man. Citizens', Cass Ave. and St. Louis R. R. Companies, St. Louis, Mo.
C. DENSMORE WYMAN, Gen. Man. New Orleans Traction Co., Ltd., New Orleans, La.
HENRY C. MOORE, President Trenton Street Railway Co., Trenton, N. J.
JOHN M. ROACH, Vice-President and Gen. Man. North Chicago Street Railroad Co., Chicago, Ill.
ROBERT S. GOFF, President and Gen. Man. Globe Street Railway Co., Fall River, Mass.

PLACE OF MEETING, BOSTON, MASS.

MINUTES.

TUESDAY'S SESSION.

MASSACHUSETTS CHARITABLE MECHANICS' ASSOCIATION HALL,
BOSTON, MASS., September 6, 1898.

The President, Mr. Albion E. Lang, of Toledo, O., called the meeting to order at 11 a. m.

THE PRESIDENT—Gentlemen, I have the pleasure of introducing Mayor Quincy, of Boston, who will deliver an address of welcome.

ADDRESS OF WELCOME BY HON. JOSIAH QUINCY.

Mr. President and Gentlemen of the American Street Railway Association:

It gives me a great deal of pleasure to welcome you to the city, and to express the hope that the deliberations of this large meeting of the American Street Railway Association may be both pleasant and profitable. The size of this gathering, the wide extent of the representation in this convention, and the financial magnitude of the interests involved, affords a striking illustration of the rapid development which is taking place in the electric transportation interests of the United States. They have to-day won a position as one of the greatest—as one of the most important—interests of the country. Civilization really may be said to have had its inception with the first knowledge on the part of primitive man to command some form of transportation. Civilization begins when man acquires a power of transporting himself and of transporting goods, and civilization progresses as the command of mankind over the forces of transportation, beginning with transportation in its most primitive form, increases and grows.

One great revolution occurred when mankind learned how to handle the force of steam, and how to apply it to the great work of moving passengers and moving freight. But just as steam transportation had nearly reached its limit, just about as the means of steam transportation had been practically perfected, this new force of electricity makes its advent upon the scene, and it, too, is harnessed in its performance of the work of civilization; but instead of becoming a rival of steam, directly, at any rate, this comparatively new force of electricity finds its application, so far as transportation is concerned, upon different lines. While these lines may hereafter extend, making electricity directly a rival of steam, for many of the purposes for which steam is used, up to the present time steam and electricity have divided between them two somewhat different fields of transportation; and electricity has not yet displaced steam, but has filled in a vacant part of the field. It has added to the facilities of transportation which the human race has possessed, and it has supplemented in a most important respect the working of steam, which is primarily applied to transportation over long distances, to the connecting together of States and cities at a distance from each other; it has supplemented that work by the only less important work of developing the inter-municipal and infra-municipal means of communication.

I think the economic and social results which are to follow from the development of the electrical street railway are only second in importance to those which have followed from the development of the steam railroad. I think the street railway has progressed far enough in its evolution, although it has by no means filled its full field in this country, or reached the limit of its usefulness—it has progressed far enough to enable us to see that it is an important agency in the promotion of civilization. It has immensely extended the movement of the people, and very largely that class of the population who do not travel long distances over steam railroads. It has brought the railway system into the small communities. It has connected the village and the town with the larger city and with other villages and towns by a

net-work of secondary communications, and it has, through these facilities, increased, in a very important degree, the facilities of civilization. For what does civilization consist of except in the command of mankind over the forces of nature, and in his increased ability to make all the forces of nature subservient to his own good and in man's increased ability to transport himself wherever he may choose to go. Life consists of motion, and the more we increase the facilities on the part of mankind to move its individual units from one point of the earth's surface to another point, the more we extend civilization in the higher sense of the term.

Electric railways tend to bind together the various cities and the various towns and the various communities into which mankind is divided into a great unit of communities, all of which understand each other better through the new and cheap facilities for moving about which have been brought to the world by this comparatively new agency of electricity. And so I am very glad to welcome this convention to-day as representing a new and potent force which has come into the world for the advancement of mankind. For it seems to me that it is no exaggeration to say that the electric street railway in the stage of development it has reached in this country at least fulfills that position, and is entitled to that recognition. Therefore, I am sure that it is profitable and advantageous for those who are engaged in different parts of this country in the practical administration of this new agency of civilization, in the practical control of this new force of electricity in making it subservient to the needs of man, to come together and compare notes and examine the progress that has been made in different places in the art and science of street railroading, and that they should confer about the problems—mechanical, electrical and financial—which affect the business of street railroads more or less everywhere, and that they should come into personal contact with each other, become acquainted with each other, and gain that sense of comradeship and good fellowship which comes from being engaged in a common occupation.

I am confident that this Street Railway Convention, the largest and most important, I believe, which has been held up to the present time, with its mechanical and electrical exhibits, and with the important matters which are to come before it for consideration, will accomplish something for the still further progress of this great interest and this great industry. The people of Boston are always glad to welcome these national conventions. Boston has a great electric street railway system. Not only has she one of the very greatest, and, I believe, one of the very best, street railroad transportation systems to be found anywhere in the world, but we have in the suburbs of Boston, in that chain of cities and towns which encircle Boston proper and which constitute Greater Boston, embracing as it does a million people or more within its limits; we have in these outlying cities and towns as well, highly developed systems of suburban and of interurban street railway transportation. I am sure, therefore, that this Association could not have selected a better centre in which to hold its gathering this year, in which to take account of the progress that has been made in electric street railway work during the last year, and in looking forward to the progress that is still to be made, than this city of Boston. I can only wish that your visit may be pleasant as well as profitable, and I can only say in conclusion that if there is anything which the city of Boston, as a corporation, or the citizens of Boston, individually, can do to make your stay here a pleasant one, I am sure that it will be very cheerfully done. I trust in your deliberations on the progress of the interests with which you are associated you will find, as I know you will find, that substantial and material progress in the development of this great interest has been made during the past year; and that you will be able to see before you in the new prosperity, in the wave or period of prosperity which we all believe awaits this country during the next few years, large returns in your street railway business and an inducement for the application of still further capital and still further enterprise for the still greater and more extensive development of this beneficent agency of civilization. [Applause.]

THE PRESIDENT—Mr. Mayor, I am sure that I express the sentiments of the members of this organization when I say that we are glad to be with you. On behalf of the members of this Association I tender to you our thanks for the very cordial welcome you have extended to us, and for the interesting remarks you have made. [Applause.]

The next order of business will be the calling of the roll. I will say that the executive committee has decided to make a departure in the method of calling the roll. We will consider the roll called by accepting the registration at the door as the evidence of the companies represented and the gentlemen who represent them. In that way we will facilitate our business.

(The various registers showed the following persons to be in attendance at the meeting:)

DELEGATES OF MEMBERS.

(ARRANGED ALPHABETICALLY ACCORDING TO CITIES.)

These gentlemen were in attendance at the meeting representing companies that are members of the Association:

ALLENTOWN, Pa.....A. F. Walter, Sec. and Treas., Allentown and Lehigh Valley Traction Co.
" " ....Jilson J. Coleman, Dir., Allentown and Lehigh Valley Traction Co.
ALTON, Ill.....J. F. Porter, Pres., Alton Ry. and Ill. Co.
" " .....H. H. Harrison, Elec., Alton Ry. and Ill. Co.
ATLANTA, Ga.....Ernest Woodruff, Pres. and Gen. Man., Atlanta Consolidated St. Ry. Co.
" " .....J. Carroll Payne, Vice-Pres., Atlanta Consolidated St. Ry. Co.
" " .....Thomas Elliott, Chief Eng., Atlanta Consolidated St. Ry. Co.
" " ....N. W. L. Brown, Elec., Atlanta Consolidated St. Ry. Co.
BALTIMORE, Md.....F. L. Hart, Gen. Man. and Chief Eng., Baltimore City Pass. Ry. Co.
" " ....P. O. Keilholtz, Elec. and Mech. Eng., Baltimore Consolidated Ry. Co.
" " ....J. M. Christopher, Mast. Mech., Baltimore Consolidated Ry. Co.
BATTLE CREEK, Mich. L. N. Downs, Pres. and Gen. Man., Michigan Traction Co.

BATTLE CREEK, Mich. E. Hope Norton, Vice-Pres., Michigan Traction Co.
" " " Dee Allen, Sec., Michigan Traction Co.
" " " F. I. Griswold, Supt., Michigan Traction Co.
BAY CITY, Mich.....W. R. Morrison, Asst. Gen. Man., Bay Cities Consolidated Ry. Co.
" " " .....R. S. Ashe, Supt., Bay Cities Consolidated Ry. Co.
BINGHAMTON, N. Y..G. Tracy Rogers, Pres., Binghamton R. R. Co.
" " J. P. E. Clark, Man., Binghamton R. R. Co.
BOSTON, Mass.....William A. Bancroft, Vice-Pres., Boston Elevated Ry. Co.
" " .....Charles S. Sergeant, Second Vice-Pres., Boston Elevated Ry. Co.
" " .....John T. Burnett, Sec., Boston Elevated Ry. Co.
" " .....J. H. Goodspeed, Compt., Boston Elevated Ry. Co.
" " .....Henry L. Wilson, Aud., Boston Elevated Ry. Co.
" " .....Julius E. Rugg, Supt. of Transportation, Boston Elevated Ry. Co.
" " .....R. H. Derrah, Executive Clerk, Boston Elevated Ry. Co.
" " .....Charles H. Bigelow, Insp. of Power Stations, Boston Elevated Ry. Co.
" " .....John Balch, Asst. Eng., Boston Elevated Ry. Co.
BRIDGEPORT, Conn..Andrew Radel, Pres. and Gen. Man., Bridgeport Traction Co.
" " ..George H. Sanford, Dir., Bridgeport Traction Co.
BRIDGEWATER, Mass. George A. Butman, Treas., Brockton, Bridgewater and Taunton St. Ry. Co.
" " ..A. B. Williams, Dir., Brockton, Bridgewater and Taunton St. Ry. Co.
" " ..A. C. Ralph, Supt., Brockton, Bridgewater and Taunton St. Ry. Co.
BROCKTON, Mass....Horace B. Rogers, Gen. Man., Brockton St. Ry. Co.
" " ....H. E. Reynolds, Asst. Treas., Brockton St. Ry. Co.
" " ....John P. Morse, Dir., Brockton St. Ry. Co.
" " ....A. L. McDonald, Paymaster, Brockton St. Ry. Co.
BROOKLYN, N. Y....Martin Conway, Contractor, Brooklyn City and Newtown R. R. Co.
" " ....Clinton L. Rossiter, Pres., Brooklyn Heights R. R. Co.
" " ....Ira A. McCormack, Gen. Supt., Brooklyn Heights R. R. Co.
" " ....J. H. Van der Veer, Supt. Motor Dept., Brooklyn Heights R. R. Co.
" " ....David S. Moffat, Mast. Car Builder, Brooklyn Heights R. R. Co.
" " ....Walter M. Barnaby, Acct., Brooklyn Heights R. R. Co.
" " ....V. M. Wickes, Sec. to Pres., Brooklyn Heights R. R. Co.

BROOKLYN, N. Y.....Albert L. Johnson, Pres., Nassau Elec. R. R. Co.
" " ....William F. Ham, Sec., Nassau Elec. R. R. Co.
" " ....F. S. Drake, Gen. Supt., Nassau Elec. R. R. Co.
BUFFALO, N. Y.....R. E. Danforth, Supt., Buffalo Ry. Co.
" " .....Robert Dunning, Mast. Mech., Buffalo Ry. Co.
" " .....W. Caryl Ely, Pres., Buffalo and Niagara Falls Elec. Ry. Co.
" " .....C. K. Marshall, Supt., Buffalo and Niagara Falls Elec. Ry. Co.
" " .....George Chambers, Supt., Buffalo Traction Co.
BUTTE, Mont.....Jesse R. Wharton, Gen. Man., Butte Consolidated Ry. Co.
CAMDEN, N. J.....G. Genge Browning, Treas., Camden and Suburban Ry. Co.
" " .....W. E. Harrington, Gen. Man., Camden and Suburban Ry. Co.
CHARLESTON, S. C..F. D. McEowen, Sec. and Treas., Charleston City Ry. Co.
" " ..A. S. Bayer, Dir., Charleston City Ry. Co.
" " .. T. W. Passailaigue, Gen. Supt., Charleston City Ry. Co.
CHICAGO, Ill.....John Farson, Pres., Calumet Elec. Ry. Co.
" " .....H. M. Sloan, Gen. Man., Calumet Elec. Ry. Co.
" " .....Frank R. Greene, Sec., Chicago City Ry. Co.
" " .....Thomas C. Penington, Treas., Chicago City Ry. Co.
" " ....George O. Nagle, Supt., Chicago City Ry. Co.
" " .....G. W. Knox, Elec. Eng., Chicago City Ry. Co.
" " .....A. C. Heidelberg, Asst. Supt., Chicago City Ry. Co.
" " .....C. E. Moore, Mast. Mech., Chicago City Ry. Co.
" " .....C. J. Reilly, Supt. Motive Power, Chicago City Ry. Co.
" " .....C. L. Compton, Clerk, Chicago City Ry. Co.
" " .....J. J. O'Keefe, Clerk, Chicago City Ry. Co.
" " .....Walter V. Penington, Clerk, Chicago City Ry. Co.
" " .....John M. Roach, Second Vice-Pres. and Gen. Man., North Chicago St. R. R. Co.
" " .....James R. Chapman, Man. Elec. Dept., North Chicago St. R. R. Co.
" " .....John Millan, Mast. Mech., North Chicago St. R. R. Co.
" " .....William Walmsley, Supt., South Chicago City Ry. Co.
" " .....George A. Yuille, Second Vice-Pres. and Asst. Gen. Man., West Chicago St. R. R. Co.
" " .....James R. Chapman, Man. Elec. Dept., West Chicago St. R. R. Co.
" " .....W. Frank Carr, Eng., West Chicago St. R. R. Co.
CINCINNATI, Ohio....Bayard L. Kilgour, Elec. Eng., Cincinnati St. Ry. Co.
CLEVELAND, Ohio...John Ehrhardt, Asst. Sec., Cleveland City Ry. Co.

CLEVELAND, Ohio ...Henry J. Davies, Asst. Sec. and Treas., Cleveland Elec. Ry. Co.
" " ...W. G. McDole, Aud., Cleveland Elec. Ry. Co.
COLORADO SPRINGS, Colo. A. L. Lawton, Gen. Man., Colorado Springs Rapid Transit Ry. Co.
COLUMBUS, Ohio.....W. F. Kelly, Gen. Supt., Columbus St. Ry. Co.
" " ....P. V. Burington, Sec. and Aud., Columbus St. Ry. Co.
COUNCIL BLUFFS, Ia.W. S. Dimmock, Gen. Supt., Omaha and Council Bluffs Ry. and Bridge Co.
DAYTON, Ohio.....George B. Kerper, Vice-Pres. and Gen. Man., People's Ry. Co.
" " .....George B. Kerper, Jr., Asst. Man., People's Ry. Co.
DERBY, Conn.....H. Holton Wood, Pres., Derby St. Ry. Co.
" " .....B. W. Porter, Gen. Man., Derby St. Ry. Co.
" " .....William J. Clark, Asst. to Pres., Derby St. Ry. Co.
DETROIT, Mich.....J. C. Hutchins, Vice-Pres. and Treas., Detroit Citizens' St. Ry. Co.
ELMIRA, N. Y.....James B. Cahoon, Gen. Man., Elmira and Horseheads Ry. Co.
FALL RIVER, Mass..Robert S. Goff, Pres. and Gen. Man., Globe St. Ry. Co.
" " ..H. H. Read, Treas., Globe St. Ry. Co.
" " ..John H. Bowker, Supt., Globe St. Ry. Co.
" " ..George W. Palmer, Jr., Elec. Eng., Globe St. Ry. Co.
FINDLAY, Ohio.....George B. Kerper, Pres., Findlay St. Ry. Co.
" " .....Charles D. Kinney, Treas., Findlay St. Ry. Co.
" " .....Charles F. Smith, Supt., Findlay St. Ry. Co.
GALVESTON, Texas..F. W. Fratt, Supt. and Eng., Galveston City R. R. Co.
GIRARDVILLE, Pa...E. W. Ash, Gen. Man., Schuylkill Traction Co.
" " ...C. A. Bragg, Dir., Schuylkill Traction Co.
GLOUCESTER, Mass..W. B. Ferguson, Pres., Gloucester St. Ry. Co.
" " ..A. D. Bosson, Dir., Gloucester St. Ry. Co.
" " ..H. E. Reed, Supt., Gloucester St. Ry. Co.
HAMILTON, Ont.....J. F. Little, Hamilton St. Ry. Co.
" " .....V. H. Waggoner, Elec. and Mech. Eng., Hamilton St. Ry. Co.
HARRISBURG, Pa....Frank B. Musser, Gen. Supt., Harrisburg Traction Co.
" " ....Mason D. Pratt, Eng., Harrisburg Traction Co.
HARTFORD, Conn....E. S. Goodrich, Pres., Hartford St. Ry. Co.
" " ...Elmer M. White, Cashier, Hartford St. Ry. Co.
HAZLETON, Pa.....A. Markle, Gen. Man., Lehigh Traction Co.
" " .....George W. Thompson, Supt., Lehigh Traction Co.
HOBOKEN, N. J.....G. T. Lister, Auditor, North Hudson County Ry. Co.
" " .....W. S. Hall, Supt., North Hudson County Ry. Co.
HOUSTON, Tex.....A. N. Parlin, Pres., Houston Elec. St. Ry. Co.
" " .....Newton Jackson, Adjuster, Houston Elec. St. Ry. Co.

INDIANAPOLIS, Ind...Miller Elliott, Supt., Citizens' St. R. R. Co.
JERSEY CITY, N. J...Charles Y. Flanders, Dir., Consolidated Traction Co.
" " ...Ralph H. Beach, Dir., Consolidated Traction Co.
JOHNSTOWN, Pa.....H. C. Evans, Special Delegate, Johnstown Pass. Ry. Co.
KALAMAZOO, Mich..L. N. Downs, Pres., Michigan Traction Co.
" " ..E. Hope Norton, Vice-Pres., Michigan Traction Co.
" " ..Dee Allen, Sec., Michigan Traction Co.
" " ..F. N. Rowley, Treas., Michigan Traction Co.
" " ..F. I. Griswold, Supt., Michigan Traction Co.
KANSAS CITY, Mo....Charles F. Morse, Pres., Metropolitan St. Ry. Co.
" " ...Walton H. Holmes, Vice-Pres. and Gen. Man., Metropolitan St. Ry. Co.
LANSING, Mich.....L. N. Downs, Pres., Michigan Traction Co.
" " .....Laurence Barrett, Sec. and Treas., Michigan Traction Co.
LAWRENCE, Mass....Alfred A. Glasier, Vice-Pres., Lowell, Lawrence and Haverhill St. Ry. Co.
" " ...G. E. Tripp, Treas., Lowell, Lawrence and Haverhill St. Ry. Co.
" " ...A. B. Bruce, Dir., Lowell, Lawrence and Haverhill St. Ry. Co.
" " ...N. E. Morton, Supt. Lawrence Div., Lowell, Lawrence and Haverhill St. Ry. Co.
" " ...Franklin Woodman, Supt. Haverhill Div., Lowell, Lawrence and Haverhill St. Ry. Co.
LONDON, Ont.....Charles E. A. Carr, Treas. and Gen. Man., London St. Ry. Co.
LONG ISLAND CITY, N. Y. J. R. Beetem, Vice-Pres., New York and Queens County Ry. Co.
LOWELL, Mass.....P. F. Sullivan, Sec. and Gen. Man., Lowell and Suburban St. Ry. Co.
" " .....Percy Parker, Treas., Lowell and Suburban St. Ry. Co.
" " .....A. M. Day, Elec. of Power Station, Lowell and Suburban St. Ry. Co.
" " .....M. M. Nash, Mast. Mech., Lowell and Suburban St. Ry. Co.
" " .....Andrew Moffatt, Foreman of Wood Work, Lowell and Suburban St. Ry. Co.
LYNN, Mass.....C. M. Wicker (Pres., North Shore Traction Co.), Lynn and Boston R. R. Co.
" " .....Amos F. Breed, Pres., Lynn and Boston R. R. Co.
" " .....Elwin C. Foster, Gen. Man., Lynn and Boston R. R. Co.
" " .....F. E. Smith, Auditor, Lynn and Boston R. R. Co.
" " .....John H. Cunningham, Dir., Lynn and Boston R. R. Co.
" " .....Maurice Hoopes, Elec. Eng., Lynn and Boston R. R. Co.

LYNN, Mass.....H. C. Page, Supt., Lynn and Boston R. R. Co.
" " .....H. E. Farrington, Mast. Mech., Lynn and Boston R. R. Co.
" " .....William Pestell, Elec., Lynn and Boston R. R. Co.
MANCHESTER, N. H..E. P. Shaw, Jr., Gen. Man., Manchester St. Ry. Co.
" " ..P. L. Saltonstall, Treas., Manchester St. Ry. Co.
" " ..N. H. Walker, Supt., Manchester St. Ry. Co.
MEMPHIS, Tenn .....F. G. Jones, Vice-Pres. and Gen. Man., Memphis St. Ry. Co.
" " .....C. H. Ruddock, Dir., Memphis St. Ry. Co.
MERIDEN, Conn.....N. H. Heft, Pres., Meriden Elec. R. R. Co.
" " .....Charles P. Clarke, Dir., Meriden Elec. R. R. Co.
" " .....John Henny, Supt. of Motive Power, Meriden Elec. R. R. Co.
" " .....William Appleyard, Mast. Car Builder, Meriden Elec. R. R. Co.
" " .....J. Smith, Mast. Mech., Meriden Elec. R. R. Co.
" " .....F. B. Downs, M. D., Med. Ex., Meriden Elec. R. R. Co.
" " .....E. C. Boynton, Elec. Eng., Meriden Elec. R. R. Co.
" " .....G. Stanley Heft, Elec. Eng., Meriden Elec. R. R. Co.
" " .....John F. Vaughan, Elec. Eng., Meriden Elec. R. R. Co.
MERRIMAC, Mass....G. A. Butman, Sec. and Treas., Haverhill and Amesbury St. Ry. Co.
" " ....J. H. Cunningham, Dir., Haverhill and Amesbury St. Ry. Co.
" " ....E. P. Shaw, Dir., Haverhill and Amesbury St. Ry. Co.
" " ....E. P. Shaw, Jr., Dir., Haverhill and Amesbury St. Ry. Co.
CITY OF MEXICO, Mex. Arthur S. Partridge, Eng., Compania de Ferrocarriles del Distrito Federal de Mexico.
MILFORD, Mass.....W. B. Ferguson, Pres., Milford, Holliston and Framingham St. Ry. Co.
" " .....G. A. Butman, Sec. and Treas., Milford, Holliston and Framingham St. Ry. Co.
" " .....Washington G. Benedict, Dir., Milford, Holliston and Framingham St. Ry. Co.
MILWAUKEE, Wis....Henry C. Payne, Vice-Pres., Milwaukee Electric Ry. and Light Co.
" " ....John I. Beggs, Gen. Man., Milwaukee Elec. Ry. and Light Co.
" " ....H. C. Mackay, Comp. and Aud., Milwaukee Elec. Ry. and Light Co.
" " ....T. E. Mitten, Gen. Supt. Ry. Dept., Milwaukee Elec. Ry. and Light Co.
" " ....E. W. Olds, Supt. of Rolling Stock, Milwaukee Elec Ry. and Light Co.

MINNEAPOLIS, Minn..J. F. Calderwood, Sec. and Aud., Twin City Rapid Transit Co.
MOBILE, Ala.....J. H. Wilson, Pres. and Gen. Man., Mobile Light and R. R. Co.
NASHVILLE, Tenn....Edward G. Connette, Gen Man., Nashville St. Ry.
" " ....George Swint, Gen. Supt., Nashville St. Ry.
NEWARK, N. J.....H. H. Adams, Asst. Elec. Eng., Newark and South Orange Ry. Co.
NEW BEDFORD, Mass. A. C. Gardner, Clerk and Asst. Treas., Union St. Ry. Co.
" " Edward E. Potter, Gen. Supt., Union St. Ry. Co.
" " I. W. Phelps, Claim Agent, Union St. Ry. Co.
" " Clarence A. Cook, Dir., Union St. Ry. Co.
NEW BRITAIN, Conn..Lincoln S. Risley, Sec., Central Ry. and Elec. Co.
NEW BRUNSWICK, N. J. Edward H. Radel, Gen. Man., Brunswick Traction Co.
" " " William A. Granten, Sec., Brunswick Traction Co.
" " " R. L. Rand, Supt., Brunswick Traction Co.
NEWBURYPORT, Mass. Charles Odell, Pres., Newburyport and Amesbury St. Ry. Co.
" " W. P. Clark, Dir., Newburyport and Amesbury St. Ry. Co.
NEW HAVEN, Conn...L. Candee, Sec. and Treas., Fair Haven and Westville R. R. Co.
NEW ORLEANS, La...C. Densmore Wyman, Gen. Man., New Orleans Traction Co., Ltd.
NEW YORK CITY.....H. H. Vreeland, Pres., Metropolitan St. Ry. Co.
NORFOLK, Va.....R. Lancaster Williams, Pres., Norfolk St. R. R. Co.
" " .....D. H. Hegarty, Gen. Supt., Norfolk St. R. R. Co.
NORWALK, Conn.....William F. Acton, Gen Man., Norwalk St. Ry. Co.
" " .....A. B. Hill, Eng., Norwalk St. Ry. Co.
NORWICH, Conn.....E. P. Shaw, Jr., Gen. Man., Norwich St. Ry. Co.
" " .....W. L. Adams, Sec. and Supt., Norwich St. Ry. Co.
" " .....W. A. Tucker, Treas., Norwich St. Ry. Co.
OMAHA, Neb.....D. H. Goodrich, Sec., Omaha St. Ry. Co.
PATERSON, N. J.....W. H. Borden, Mast. Mech., Paterson Ry. Co.
PHILADELPHIA, Pa...J. C. Lugar, Gen. Man., Roxborough, Chestnut Hill and Norristown Ry. Co.
" " ..W. H. Janney, Supt., Roxborough, Chestnut Hill and Norristown Ry. Co.
" " ..John A. Brill, Dir., Roxborough, Chestnut Hill and Norristown Ry. Co.
PITTSBURG, Pa.....J. G. Carroll, Foreman, United Traction Co.
PORT CHESTER, N. Y..N. H. Heft, Elec. Eng., Port Chester St. Ry. Co.
" " " ..W. J. Clark, Dir., Port Chester St. Ry. Co.
PORT HURON, Mich..William Canham, Pres., City Elec. Ry. Co.
" " " ..William L. Jenks, Treas., City Elec. Ry. Co.

PORTLAND, Me.....William R. Wood, Pres., Portland R. R. Co.
" " .....Edward A. Newman, Gen. Man., Portland R. R. Co.
" " .....Charles F. Libby, Dir., Portland R. R. Co.
" " .....A. Whitney, Dir., Portland R. R. Co.
" " .....Bion B. Libby, Portland R. R. Co.
" " .....T. Coleman Boyd, Vice Pres., Portland and Yarmouth Elec. Ry. Co.
" " .... W. G. Wheildon, Treas., Portland and Yarmouth Elec. Ry. Co.
" " .....Louis B. Wheildon, Gen. Man., Portland and Yarmouth Elec. Ry. Co.

PORTSMOUTH, Va....Horace G. Williams, Pres., Portsmouth St. Ry. Co.

PROVIDENCE, R. I....J. J. Whipple, Pres., Providence and Taunton St. Ry. Co.
" " ...Henry V. A. Joslin, Sec., Union R. R. Co.
" " ...A. T. Potter, Gen. Man., Union R. R. Co.
" " ...A. E. Potter, Supt. Transportation, Union R. R. Co.
" " ...M. H. Brondson, Ch. Eng., Union R. R. Co.
" " ...W. D. Wright, Elec., Union R. R. Co.

QUINCY, Ill.....E. K. Stone, Jr., Sec. and Supt., Quincy Horse Ry. and Carrying Co.
" " .....C. E. Stone, Asst. Supt., Quincy Horse Ry. and Carrying Co.

QUINCY, Mass.....John R. Graham, Pres., Quincy and Boston St. Ry. Co.
" " .....Fred W. Smith, Treas., Quincy and Boston St. Ry. Co.
" " .....Benjamin J. Weeks, Gen. Supt., Quincy and Boston St. Ry. Co.
" " .....Arthur Burnham, Dir., Quincy and Boston St. Ry. Co.
" " .....A. D. Gore, Supt. of Con., Quincy and Boston St. Ry. Co.
" " .....D. J. McLane, Ch. Elec., Quincy and Boston St. Ry. Co.

READING, Pa.....John A. Rigg, Pres., United Traction Co.
" " .....C. A. Bragg, Dir., United Traction Co.
" " .....S. P. Light, Dir., United Traction Co.
" " .....R. E. Moore, Dir., United Traction Co.
" " .....W. R. McIlvain, Dir., United Traction Co.

RICHMOND, Va.....E. Randolph Williams, Pres., Richmond Traction Co.
" " .....R. Lancaster Williams, Treas., Richmond Traction Co.

ROCHESTER, N. Y...J. W. Hicks, Supt., Rochester Ry. Co.
" " ...Le Grand Brown, Ch. Eng., Rochester Ry. Co.
" " ...J. H. Stedman, Man. Transfers, Rochester Ry. Co.

ROCKLAND, Me.....Thomas Hawken, Gen. Man., Rockland, Thomaston and Camden St. Ry. Co.
" " .....H. C. Weston, Asst. Supt., Rockland, Thomaston and Camden St. Ry. Co.
" " .....Valentine Chisholm, Elec., Rockland, Thomaston and Camden St. Ry. Co.

SIOUX CITY, Ia.....Chester P. Wilson, Sec., Treas. and Gen. Man., Sioux City Traction Co.
SPRINGFIELD, Mass..George W. Cook, Cashier, Springfield St. Ry. Co.
" " ..George S. Webb, Elec., Springfield St. Ry. Co.
" " ..George F. Reed, Elec. Supt., Springfield St. Ry. Co.
" " ..F. E. Sarrin, Roadmaster, Springfield St. Ry. Co.
SPRINGFIELD, O.....S. L. Nelson, Sec., Treas. and Gen. Man., Springfield Ry. Co.
" " .....L. F. Purcell, Dir., Springfield Ry. Co.
" " .....L. O. Williams, Supt., Springfield Ry. Co.
ST. JOSEPH, Mich....W. Worth Bean, Pres., St. Joseph and Benton Harbor Elec. Ry. and Lt. Co.
ST. JOSEPH, Mo.....W. T. Van Brunt, Vice-Pres. and Gen. Man., St. Joseph Ry., Light, Heat and Power Co.
" " " .....J. H. Van Brunt, Supt. Ry., St. Joseph Ry., Light, Heat and Power Co.
ST. LOUIS, Mo.....D. G. Hamilton, Pres., Cass Ave. and Fair Grounds Ry. Co.
" " " .....Robert McCulloch, Vice-Pres. and Gen. Man., Cass Ave. and Fair Grounds Ry. Co.
" " " .....Richard McCulloch, Elec. Eng., Cass Ave. and Fair Grounds Ry. Co.
" " " .....Bruce Hamilton, Cass Ave. and Fair Grounds Ry. Co.
" " " .....D. G. Hamilton, Pres., Citizens' Ry. Co.
" " " .....Robert McCulloch, Vice-Pres. and Gen. Man., Citizens' Ry. Co.
" " " .....Richard McCulloch, Elec. Supt., Citizens' Ry. Co.
" " " .....Frank J. Duffy, Clerk, Citizen's Ry. Co.
" " " .....F. B. Brownell, Receiver, People's Ry. Co.
" " " .....D. G. Hamilton, Pres., St. Louis R. R. Co.
" " " .....Robert McCulloch, Gen. Man., St. Louis R. R. Co.
" " " .....Richard McCulloch, Elec. Eng. and Civil Eng., St. Louis R. R. Co.
" " " .....Harry Scullin, Vice-Pres. and Gen. Man., Union Depot R. R. Co.
" " " .....Charles H. Pierson, Mast. Mech., Union Depot R. R. Co.
SYRACUSE, N. Y.....William H. Tucker, Mech. Eng., Syracuse Rapid Transit Ry. Co.
TAUNTON, Mass.....S. M. Thomas, Pres., Taunton St. Ry. Co.
" " .....George F. Seibel, Supt., Taunton St. Ry. Co.
" " .....C. B. Reynolds, Eng., Taunton St. Ry. Co.
" " .....F. S. Quandlett, Elec., Taunton St. Ry. Co.
TOLEDO, O.....Albion E. Lang, Pres., Toledo Traction Co.
" " .....F. B. Perkins, Elec. Eng., Toledo Traction Co.
" " .....E. J. Bechtel, Supt. Con., Toledo Traction Co.
" " .....George A. Cooke, Asst. Supt., Toledo Traction Co.

TOPEKA, Kan.....A. M. Patten, Supt., Topeka Ry. Co.
TRENTON, N. J.....Henry C. Moore, Pres., Trenton St. Ry. Co.
" " .... R. S. Woodruff, Counsel, Trenton St. Ry. Co.
" " .....Samuel Moore, Asst. Sec., Trenton St. Ry. Co.
" " .....P. E. Hurley, Supt., Trenton St. Ry. Co.
WAKEFIELD, Mass..C. W. Holmes, Mystic Valley Ry. Co.
" " ..W. M. Butler, Mystic Valley Ry. Co.
" " ..George A. Butman, Dir., Wakefield and Stoneham Ry. Co.
" " ..James F. Shaw, Dir., Wakefield and Stoneham Ry. Co.
WARREN, Mass.....N. S. Myrick, Pres., Warren, Brookfield and Spencer St. Ry. Co.
" " .....G. A. Butman, Sec. and Treas., Warren, Brookfield and Spencer St. Ry. Co.
" " .....C. A. Jefts, Supt., Warren, Brookfield and Spencer St. Ry. Co.
" " .....Charles A. Richardson, Dir., Warren, Brookfield and Spencer St. Ry. Co.
WASHINGTON, D. C..R. W. Palmer, Elec., Capital Traction Co.
" " ..Theodore J. King, Sec., Treas. and Supt., Columbia Ry. Co.
" " ..A. B. Coppes, Auditor, Columbia Ry. Co.
WATERBURY, Conn..M. E. Stark, Supt., Waterbury Traction Co.
WEBB CITY, Mo.....H. P. Fitch, Sec., Southwest Missouri Elec. Ry. Co.
" " " .....F. H. Fitch, Supt., Southwest Missouri Elec. Ry. Co.
WEST HAVEN, Conn..Israel A. Kelsey, Gen. Man., Winchester Ave. R. R. Co.
" " " ..A. E. Pond, Supt., Winchester Ave. R. R. Co.
WILKESBARRE, Pa...John Graham, Treas. and Gen. Man., Wilkesbarre and Wyoming Valley Traction Co.
" " ...J. C. Meixel, Supt., Wilkesbarre and Wyoming Valley Traction Co.
" " ...James Fagan, Elec. Eng., Wilkesbarre and Wyoming Valley Traction Co.
" " ...P. R. Raife, Stockholder, Wilkesbarre and Wyoming Valley Traction Co.
WILLIAMSPORT, Pa..Ernest H. Davis, Gen. Man., Williamsport Pass. Ry. Co.
" " ..Charles T. Herrick, Supt. of Motive Power, Williamsport Pass. Ry. Co.
" " ..James O. Goole, Supt. Power, Williamsport Pass. Ry. Co.
WORCESTER, Mass..Francis H. Dewey, Pres., Worcester Cons. St. Ry. Co.
" " ..A. H. Stone, Treas., Worcester Cons. St. Ry. Co.
" " ..John N. Akarman, Supt., Worcester Cons. St. Ry. Co.
YORK, Pa.....W. H. Lanius, Pres., York St. Ry. Co.
" " .....Charles H. Mayer, Treas. and Pur. Agent., York St. Ry. Co.
YOUNGSTOWN, O.....A. A. Anderson, Gen. Man. and Treas., Mahoning Valley Ry. Co.

REPRESENTATIVES OF NON-MEMBERS.

(Arranged Alphabetically According to Cities.)

Companies not members of the Association were represented as follows:

Amherst, Mass.....L. N. Wheelock, Supt., Amherst and Sunderland Ry. Co.
Amsterdam, N. Y...E. F. Seixas, Supt., Amsterdam St. R. R. Co.
Asbury Park, N. J..S. F. Hazelrigg, Man. and Elec., Atlantic Coast Elec. R. R. Co.
Athol, Mass.....W. D. Smith, Gen. Man., Athol and Orange St. Ry. Co.
" " .....A. P. Granger, Elec., Athol and Orange St. Ry. Co.
Bangor, Me.....W. H. Snow, Supt., Bangor St. Ry. Co.
" " .....C. H. Sanborn, Foreman, Bangor St. Ry. Co.
" " .....James A. Green, Supt., Bangor, Hampden and Winterport St. Ry. Co.
" " .....I. L. Meloon, Supt., Bangor, Orono and Oldtown Ry. Co.
Braintree, Mass...John F. Merrill, Pres., Braintree St. Ry. Co.
Buffalo, N. Y.....U. L. Upson, Man., Buffalo and Aurora Ry. Co.
Carbondale, Pa....C. E. Flynn, Gen. Man., Carbondale Traction Co.
Catskill, N. Y.....Louis E. Robert, Pres., Catskill Elec. Ry. Co.
Columbia, Pa.....Frank S. Given, Asst. Gen. Man., Pennsylvania Traction Co.
Cornwall, Ont.....D. A. Starr, Pres., Cornwall Elec. St. Ry. Co., Ltd.
Cottage City, Mass.Josiah Quincy, Pres., Cottage City St. Ry. Co.
" " " Fred. Nichols, Treas., Cottage City St. Ry. Co.
" " " John A. Duggan, Man., Cottage City St. Ry. Co.
Dubuque, Ia.....H. G. Torbet, Gen. Man., Dubuque Light and Traction Co.
Easton, Pa. .....Charles F. Roberts, Shop Foreman, Easton Transit Co.
Exeter, N. H.....C. A. Cotton, Dir., Exeter St. Ry. Co.
" " .....W. D. Lovell, Dir., Exeter St. Ry. Co.
" " .....A. E. McReel, Supt., Exeter St. Ry. Co.
Fall River, Mass..P. L. Saltonstall, Treas., Fall River and Newport St. Ry. Co.
" " " ..R. H. Fillmore, Jr., Supt., Fall River and Newport St. Ry. Co.
Fitchburg, Mass....W. W. Sargent, Supt., Fitchburg and Leominster St. Ry. Co.
" " ....W. J. Beane, Foreman Line Equip., Fitchburg and Leominster St. Ry. Co.
Framingham, Mass..J. J. Hennessy, Supt., Framingham Union St. Ry. Co.
Georgetown, Mass.B. F. Bartlett, Supt., Haverhill, Georgetown and Danvers St. Ry. Co.
Gloucester, Mass..W. A. Larrabee, Supt., Gloucester, Essex and Beverley St. Ry. Co.

HALIFAX, N. S.....Fred. A. Huntress, Man., Halifax Elec. Tramway Co., Ltd.
HARTFORD, Conn...J. W. Haynes, Sec. and Supt., Hartford, Manchester and Rockville Tramway Co.
HINGHAM, Mass.....Gardner F. Wells, Supt., Hingham St. Ry. Co.
" " .....George W. Semple, Mast. Mech., Hingham St. Ry. Co.
HOLYOKE, Mass.....William S. Loomis, Pres., Holyoke St. Ry. Co.
KINGSTON, N. Y.....C. Gordon Reel, Supt., Colonial City Traction Co.
LEOMINSTER, Mass..Harry L. Pierce, Pres., Fitchburg and Suburban St. Ry. Co.
" " ..H. G. Lowe, Treas., Fitchburg and Suburban St. Ry. Co.
" " ..H. C. Garfield, Supt., Fitchburg and Suburban St. Ry. Co.
" " ..George H. Burgess, Supt., Leominster and Clinton St. Ry. Co.
" " ..Edward T. Bates, Foreman, Leominster and Clinton St. Ry. Co.
LITTLE ROCK, Ark...J. H. Waterman, Eng., Little Rock Traction and Elec. Co.
LYNCHBURG, Va.....H. P. Woodson, Pres., Lynchburg and Rivermont St. Ry. Co.
MACON, Ga.....E. E. Winters, Supt., Consolidated St. R. R. Co.
MANSFIELD, Mass...Douglass A. Brooks, Pres., Mansfield and Easton St. Ry. Co.
" " ...Charles E. Ribber, Gen. Man., Mansfield and Easton St. Ry. Co.
MARLBOROUGH, Mass. E. P. Shaw, Jr., Gen. Man., Marlborough St. Ry. Co.
" " H. E. Bradford, Supt., Marlborough St. Ry. Co.
MIDDLETOWN, N. Y..W. A. Granten, Gen. Man., Middletown-Goshen Traction Co.
MUSKEGON, Mich....Frederick W. Thompson, Supt., Muskegon St. Ry. Co.
NASHVILLE, Tenn ...T. O. Price, Pres., Citizens' Rapid Transit Co.
NATICK, Mass.....George F. Keep, Supt., Natick and Cochituate St. Ry. Co.
" " .....F. P. Quackenbush, Asst. Supt., Natick and Cochituate St. Ry. Co.
" " .....W. B. Ferguson, Pres., South Middlesex St. Ry. Co.
" " .....J. W. Sullivan, Supt., South Middlesex St. Ry. Co.
NEWTON, Mass.....Leonard D. Ahl, Treas., Commonwealth Ave. St. Ry. Co.
" " .....G. H. Martin, Foreman, Commonwealth Ave. St. Ry. Co.
" " .....Winthrop Coffin, Pres., Newton St. Ry. Co.
NO. ABINGTON, Mass..John Spence, Vice-Pres., Rockland and Abington St. Ry. Co.
" " " A. H. Walcott, Supt., Rockland and Abington St. Ry. Co.

No. Abington, Mass. William Schneider, Supt. of Line, Rockland and Abington St. Ry. Co.
No. Adams, Mass....Clinton Q. Richmond, Pres., Hoosac Valley St. Ry. Co.
Norfolk, Mass.....Francis Doane, Pres., Norfolk Central St. Ry. Co.
" " ... .R. D. Colburn, Supt., Norfolk and Suburban St. Ry. Co.
Norristown, Pa....R. M. Douglass, Sec. and Treas., Schuylkill Valley Traction Co.
Northampton, Mass. E. C. Clark, Jr., Supt., Northampton St. Ry. Co.
Norton, Mass.....Douglass A. Brooks, Gen Man., Norton and Taunton St. Ry. Co.
" " .....Douglass A. Brooks, Gen. Man., Norton and Attleboro St. Ry. Co.
Norway, Me.....F. B. Lee, Gen. Man., Norway and Paris St. Ry. Co.
Orange, N. J. .....Walton Whittlesey, Receiver, Suburban Traction Co.
Palmer, Mass.....Charles F. Grosvenor, Pres., Palmer and Monson St. Ry. Co.
" ". .....C. D. Shepard, Supt., Palmer and Monson St. Ry. Co.
Philadelphia, Pa..Albert Layton Register, Dir., Fairmont Park Transportation Co.
Pittsfield, Mass...P. H. Dolan, Gen. Man., Pittsfield Elec. St. Ry. Co.
Pittsburg, Pa.....George W. Saxton, Elec., Pittsburg and Birmingham Traction Co.
Plymouth, Mass....Albert L. Gordon, Pres., Plymouth and Kingston St. Ry. Co.
" " ....Charles I. Litchfield, Dir., Plymouth and Kingston St. Ry. Co.
" " ....B. F. Sherburne, Supt., Plymouth and Kingston St. Ry. Co.
Port Jervis, N. Y...C. J. Field, Vice-Pres., Port Jervis Elec. St. Ry. Co.
" " " ...E. H. Beachum, Supt., Port Jervis Elec. St. Ry. Co.
Portland, Me.....H. R. MacLeod, Sec. and Treas., Portland and Cape Elizabeth Ry. Co.
" " .....A. S. Macreadie, Supt., Portland and Cape Elizabeth Ry. Co.
" " .....John Wright, Ch. Eng., Portland and Cape Elizabeth Ry. Co.
" " .....M. R. Griffeth, Supervisor, Portland and Cape Elizabeth Ry. Co.
Portsmouth, N. H..W. G. Meloon, Supt., Portsmouth, K. and G. St. Ry Co.
Quebec, Can.....Harold J. Surtees, Elec., Quebec District Ry. Co.
Quincy, Mass.....E. Moody Boynton, Pres., Boston, Quincy and Fall River R. R. Co.
Ridge Hill, Mass..Charles H. Killam, Vice-Pres., Hanover St. Ry. Co.

ROCHESTER, N. Y...W. H. Gillette, Supt., Rochester, Charlotte and Manitou R. R. Co.
SANFORD, Me.....C. A. Bodwell, Gen. Man., Mousam River R. R. Co.
SEATTLE, Wash.....E. O. Sessions, Con. Eng., Seattle Elec. R. R. Co.
SOUTH WALPOLE, Mass. Edward F. Draper, Norfolk Southern St. Ry. Co.
SPRINGFIELD, Vt....Edward C. Crosby, Vice-Pres. and Gen. Man., Springfield Elec. Ry. Co.
STAPLETON, N. Y....Henry S. Kemp, Staten Island Elec. Ry. Co.
" " ....W. B. Rockwell, Pres., Staten Island Midland R. R. Co.
TOLEDO, O.....W. B. Brockway, Auditor, Toledo, Bowling Green and Fremont Ry. Co.
WASHINGTON, D. C..Thomas O'Brien, Supt., Brightwood Ry. Co.
" " ..J. Colvin, Supt., Washington, Arlington and Mt. Vernon R. R. Co.
WASHINGTON, Pa....John A. Willson, Sec., Washington Elec. St. Ry. Co.
WATERVILLE, Me...J. A. Hamblin, Gen. Man., Waterville and Fairfield Ry. and Light Co.
WESTFIELD, Mass...Robert T. Lee, Supt., Woronoco St. Ry. Co.
WICHITA, Kan.....Herbert B. Church, Pres., Wichita Railway, Light and Power Co.
WILLIAMSTOWN, Pa..S. Ritter Ickes, Constructor, Lykens and Williams Valley St. Ry. Co.
" " ..William E. Stewart, Constructor, Lykens and Williams Valley St. Ry. Co.
WILMINGTON, N. C..A. B. Skelding, Gen. Man., Wilmington St. Ry. Co.
WOONSOCKET, R. I..H. M. Young, Supt., Woonsocket St. Ry. Co.
WORCESTER, Mass..Edwin L. Watson, Pres., Worcester and Suburban St. Ry. Co.
" " ..H. L. Osgood, Asst. Supt., Worcester and Suburban St. Ry. Co.
" " ..John W. Ogden, Supt., Worcester and Clinton St. Ry. Co.

REPRESENTATIVES OF FOREIGN RAILWAYS.

The following named gentlemen were present:

M. Marcel Delmas, C. E., French Government, Paris, France.
T. Y. Dzushi, Chief of Finance and Manager of Stores, Imperial Government Railways, Japan.
A. Norman Issertel, Manaos Railway Co., Brazil.
L. H. Slotherd, Central London Railway Co., London, England.
Koran Sugahara, Chief Engineer, Kobu Railway Co., Japan.
Alfred Wiseman, Chairman of Directors, Light, Railway and General Construction Co., Ltd., Birmingham, England.

REPRESENTATIVES OF STEAM RAILROADS.

The following named gentlemen connected with steam railroads were present:

David Bruce, Supt., Union Trunk Line, Seattle, Wash.
Charles P. Clarke, Pres., New York, New Haven and Hartford Railroad Co., New Haven, Conn.
N. C. Keeran, Wabash Railroad Co., Chicago, Ill.
George F. Ricker, Chicago and Northwestern Railway Co., Chicago, Ill.
Constant Q. Ring, Boston and Albany Railroad Co., Winthrop, Mass.
W. D. Young, Baltimore and Ohio Railroad Co., Baltimore, Md.

REPRESENTATIVES OF TRADE PAPERS.

Representatives of the technical press were in attendance at the meeting, as follows:

AMERICAN ELECTRICIAN.
E. E. Wood.

ELECTRICAL AGE.
Walter Muller.

ELECTRICAL ENGINEER.
C. B. Fairchild. A. C. Shaw. Joseph Wetzler.

ELECTRICAL REVIEW.
Stephen H. Goddard. Russell Howland.

ELECTRICAL WORLD.
F. F. Grant. Franklin A. Johnston. W. J. Johnston.
F. S. Palmer. R. F. Ross. J. E. Woodbridge.

ENGINEERING NEWS.
Alfred E. Kornfeld. Samuel B. Read. John J. Swann.

MUNICIPAL RECORD AND ADVERTISER.
T. Stoddard Beattie. C. L. F. Duhain. George R. Warden.

POWER.
F. R. Low.

RAILROAD GAZETTE.
Edward A. Simmons. Arthur J. Wood.

RAILWAY AGE.
Frank S. Dinsmore.

RAILWAY REVIEW.
W. C. Tyler.

RAILWAY WORLD.
(London, England.)
Walter Redding.

STREET RAILWAY JOURNAL.

John B. Bennett.	E. E. Higgins.
Henry W. Blake.	A. O. Kittredge.
A. S. Buttenheim.	James H. McGraw.
C. B. Fairchild, Jr.	C. S. McMahan.
A. F. Glover.	W. H. Taylor.

STREET RAILWAY REVIEW.
George J. M. Ashby. H. J. Kenfield. F. S. Kenfield.
Daniel Royse. Henry H. Windsor.

WESTERN ELECTRICIAN.
Mortimer L. Godkin. Frank L. Perry.

OFFICIAL STENOGRAPHER.
T. E. Crossman.

APPROVAL OF THE MINUTES OF THE LAST REGULAR MEETING.

THE PRESIDENT—The next order of business is the reading of the minutes of the last meeting, and unless objection is made the minutes will stand approved as printed. (No objection.)

We will now give an opportunity to companies represented that are not members of the Association to acquire membership.

NEW MEMBERS.
(ARRANGED ALPHABETICALLY ACCORDING TO CITIES.)

The following companies then acquired membership or had done so since the last meeting:

BALTIMORE, Md.....Baltimore Consolidated Ry. Co.
BRIDGEWATER, Mass..Brockton, Bridgewater and Taunton Street Railway Co.
CHICAGO, Ill.....South Chicago City Railway Co.
ELMIRA, N. Y.....Elmira and Horseheads Railway Co.
GLOUCESTER, Mass...Gloucester Street Railway Co.
MILFORD, Mass.....Milford, Holliston and Framingham Street Railway Co.
NEW HAVEN, Conn....Fair Haven and Westville Street Railway Co.
PITTSBURG, Pa.....United Traction Co.
PORT CHESTER, N. Y..Port Chester Street Railway Co.
PORTLAND, Me.....Portland and Yarmouth Street Railway Co.
PORTSMOUTH, Va.....Portsmouth Street Railway Co.
PROVIDENCE, R. I....Providence and Taunton Street Railway Co.
SPOKANE, Wash.....Spokane Street Railway Co.
ST. JOSEPH, Mo.....St. Joseph Railway, Light, Heat and Power Co.
WARREN, Mass.....Warren, Brookfield and Spencer Street Railway Co.

RESOLUTION RATIFYING AND CONFIRMING THE DATES FOR HOLDING THE MEETING.

Mr. Kerper, Dayton—Mr. President, I offer the following resolution:

Whereas, The Executive Committee of this Association, at its meeting held in Boston, January 25 and 26, 1898, owing to its inability to secure a proper hall for the annual meeting of the Association at any other time, issued its call for the meeting of the Association to be held in Boston, September 6, 7, 8 and 9, 1898;

Resolved, That the action of the said Executive Committee be and the same is hereby approved, ratified and confirmed, and that this meeting is hereby declared to be the regular annual meeting of the Association for the year 1898.

Resolved, That all of the business of the Association be proceeded with at this meeting in accordance with the By-Laws of the Association applicable to regular meetings called and held within the dates provided by Article VII. of said By-Laws.

Mr. Hamilton, St. Louis—Mr. President, I second the resolution.

The resolution was unanimously adopted.

The President—The next order of business is the address of the President.

ADDRESS OF THE PRESIDENT.

President Lang read the following address:

The American Street-Railway Association—

Gentlemen: We are to-day, for the seventeenth consecutive year, assembled in furtherance of the objects of our Association, under conditions most favorable to a pleasant and profitable meeting, for we are in the house of our father, the city of our birth.

As the presiding officer of the Association, and in the name of the street railway men of Boston, I bid you a hearty, sincere and joyous welcome.

Amid the circumstances of this meeting our thoughts naturally turn to the time, the persons, and the conditions existing when the Association was formed. Some then present are with us to-day, and, whether residents of Boston or not, certainly experience a pardonable pride in the growth and achievements of the Association as shown by its published proceedings and emphasized by the large number in attendance.

Of the Boston people who were present at the outset Calvin A. Richards, President of the Metropolitan Railroad Company, now a

part of the Boston Elevated Railway system, was a conspicuous and active member. In 1884 he was elected President of the Association, and those who knew him best feel a deep grief that death has robbed us of a member whose welcome, if present, would know no bounds.

As I trace the history of the Association from its inception I am convinced that its founders, in the words of Emerson, "builded better than they knew," for is it not remarkable that they should have chosen a name and set forth in our Constitution the objects of the Association so wisely and well that no material change has been required to adapt them to present conditions, which are so radically different from those then prevailing?

The Constitution then, as now, says: "The object of this Association shall be the acquisition of experimental, statistical and scientific knowledge relating to the construction, equipment and operation of street railways," etc.

The need for experimental knowledge in connection with a mule goes without saying, and statistical and scientific knowledge with reference to harness, cars or strap-rails sounds very ancient as compared with engines, boilers, generators, girder rails, vestibuled cars, lightning-arresters, Ohms, volts, watts, amperes, etc., etc., the familiar subjects of to-day. I do not mean, however, to belittle the value of the investigation, discussion and association of the earlier days, because there are too many veterans present (and I might myself be called one) who can testify to the great benefit derived therefrom. It does seem, however, that the necessity for holding meetings in different cities was greater formerly than now, for in order to know very much about what others had done or were doing we had to go to them, whereas now we can see almost everything in connection with our business in the room below except the mercurial portion known as the State legislature, common council, tax gatherer and ubiquitous damage lawyer, so called.

That this is a fair inference is also shown by the records, for the second meeting was held in Chicago, which then, as now, claimed to be the metropolis of the West, but which has been disputed by St. Louis. While it was doubtless an enjoyable meeting, Chicago was apparently too much of a shock to the nervous systems of our Eastern members, as it was determined to return East the following year and New York was selected. Of course New York never fails to interest, but there is one obstacle always difficult to overcome in meetings at that point, which is that one cannot remain long enough to see it all. What the delegates failed to find there, however, they looked for the year following at St. Louis, and it proved so good that they naturally looked for more near by, hence next sought out Cincinnati. Cincinnati, as was expected, proved to be ideal, but the East offered so many attractions in the contest for location that Philadelphia captured the convention following.

Dignified and made bold by the Philadelphia meeting, the cry became "On to Washington." The pleasure and profit of that meeting cannot be doubted, but the West was evidently becoming jealous, and, to secure another meeting, played its trump card, and Minneapolis won out. It goes without saying that this meeting was profitable to the Association as well as to the good people of Minneapolis. Electricity as a motive power was at that time so far advanced that all knew that it was bound to come. Its discussion consumed nearly all the time of the meeting, and we left Minneapolis people more strongly impressed than ever before that they had made no mistake in adopting electricity as a motive power and that they wanted still more of it.

In journeying to Buffalo the following year the Association was well repaid, for much progress along electrical lines was found, and it undoubtedly stimulated the movement in this direction, hence a dash was made for Pittsburg the following year. No one will ever forget that great concern, the Westinghouse Electric and Manufacturing Company, which was then and is still so energetic and progressive in the electrical field, and the visit to whose works proved to be such an interesting feature of the meeting.

In going to Cleveland for our next meeting we did wisely, for we there found roads and power-houses further advanced toward the goal of perfection than could, perhaps, at that time have been found at any other place in the country. At the Milwaukee meeting the year following we were met with the most extensive display of electrical apparatus witnessed up to that time, presided over by scores of ever-watchful, energetic and intelligent supply men, and our meeting proved to be unusually profitable. By this time we were all so firmly established on the electrical foundation that to see an electric road or inspect electrical appliances was no novelty, but, still searching for greater things, we turned toward Atlanta. We not only found a great exposition of the products of the country here assembled, but very much in the electrical line to interest us. The cordiality of our reception by the people was a crowning feature of this meeting.

In turning our steps toward Montreal a year later, we endeavored to give of the good things we had seen and experienced at former meetings and to acquire further knowledge of our Canadian brothers. It was the first attempt at holding a meeting beyond our borders, and for various reasons was slimly attended, still it was not void of benefit, for it revitalized the Association to such an extent that the meeting at St. Louis the following year was unusually interesting and valuable. Having had a foretaste of the place, we, of course, were eager to return, and our reception by the people could not have been more cordial. It was left for Niagara Falls, however, to overshadow what up to that time had been considered great and to reveal to us the vast in electrical units and in nature. We also found the manufacturers and supply men present in abundance, and our meeting there was voted a success in every particular.

I have thus briefly recounted our movements and spoken of the motives which, it has seemed from the best information at hand, prompted the Association in selecting its places of meeting, and the value of such selections and other reasons why the Association has grown to its present proportions and standing. Its growth and experiences, like all other organizations, have not been without some severe trials, but, unlike the prodigal son, we have wasted none of our substance in riotous living, but have improved at each successive step and now reach home, not only the birthplace of the Association, but the home of the electrical industries in a larger sense, perhaps, than any other locality in the world. The people of Boston not only furnish money with a lavish hand to carry forward the work of developing the subtle power now so useful to us and all mankind, but also much of the brains and energy needed to make its use practical. Of this fact one circumstance will bear witness, and it is that Mr. C. A. Coffin, a Boston man, is still retained at the head of the largest electrical manufacturing corporation in the United States, if not in the world.

Having laid in this city the foundation of the splendid structure we have since reared, it is very proper that we should return and dwell therein for a few days. Everything gives promise of this being the largest meeting in our existence. If we do not make it one of the most valuable the fault will be with ourselves. Let us hope to leave such an impression that the Boston people will say, "It was good to have them with us."

In the growth and development of our Association and the business we represent, let us not forget the priceless and unrivaled assistance rendered by the technical press. Without a spokesman, a guardian ever faithful to our interests as they have been, our progress would have been much slower and our pathway exceeding rough.

Nor must we for a moment forget (if we could) the indefatigable supply man, for he is the noblest Roman of them all. It is his courage, foresight and energy in taking up the new and useful article, and pressing it upon our attention, that helps to effect economies. We may sometimes be prematurely persuaded, but that is not the fault of the supply man; it is simply one of the arts of his trade necessary for us to learn. But, seriously, without them the meetings of our Association would be materially weakened and lose much of their interest and value. Let us, then, not fail to give them and their exhibits all the attention and examination time will permit.

The Executive Committee has prepared a very excellent list of papers to be read, and I trust that all will join in giving them generous discussion. Some of the writers of the papers have told me that they expected more benefit would be derived by members from discussion than from the paper itself. This should be inducement enough to keep

all in constant attendance. Bear in mind that in so doing we are also promoting the best interests of the Association, as well as honoring the writers of the papers, which is their due and our duty. While on this subject let me here call attention to the necessity of having at our meetings papers which will interest all the members—not only the mechanical and electrical engineers, but the general managers and even presidents of companies. We need all these officials with us at every convention, hence we must provide something of interest to them.

Each and every member must be made to feel that he has been benefited by attending our conventions, and likewise the company represented, or our Association will cease growing. As a result of our deliberations economies should follow without injury to the public service, all of which will tend toward a further realization of the objects of our Association, which are "the establishment and maintenance of a spirit of fraternity among the members" and in the largest degree "the encouragement of cordial and friendly relations between the roads and the public."

Under the head of general business, as provided in our by-laws, or at some other appropriate time, a sort of experience meeting or informal discussion of all subjects relating to our business should take place, where each member shall feel free to ask any question that occurs to him upon which he desires information, and some one stand ready to answer.

I venture to suggest a few subjects arising almost daily where in this way very helpful information could be obtained, viz.:

"The Suburban Railroad; on what terms and conditions should they enter over our tracks, and how can their building be encouraged?"

"The issuing of transfer checks or tickets, and how abuses connected therewith can be limited."

"The equipping of buildings with automatic sprinklers, and the economy resulting therefrom."

"The cast or electric welding of rail joints, and the saving effected in current and care."

"The discussion or agitation of municipal ownership of franchises, and the most intelligent way to treat the subject."

"To what extent companies should engage in the amusement business, and the best methods of conducting the same."

"A comparison of the cost of materials and supplies and expenses of operation."

"How best to promote the interests of employes and in return secure from them the highest degree of service and loyalty."

These and many other subjects of kindred nature, considered in this manner, would awaken great interest.

I desire to call attention to our fellow-workers and associates, the Accountants' Association, which hold their meetings simultaneously

with ours each year and are even now in session in another part of the building. The whole business of the street railway revolves around the Accountants' office and many of us can attest the value of having efficient persons in charge thereof. It is with the hope of enabling them to make their services more valuable to their respective companies that the Association was formed; hence they should receive every assistance it is possible for us to render. I bespeak for them your cordial co-operation.

In closing I wish to thank our efficient Secretary and the Executive Committee for their cordial aid and support during the year, and to assure the members of the Association of my great appreciation of the honor of being called a year ago to the office of President. [Applause.]

VOTE OF THANKS TO MAYOR QUINCY.

Mr. McCormack, Borough of Brooklyn—I move that the members of this Association give a rising vote of thanks to the Mayor of Boston for his kind address of welcome to this Association.

Motion carried by a rising vote.

The President—The next order of business will be the report of the Executive Committee.

REPORT OF THE EXECUTIVE COMMITTEE.

The Secretary read the report, as follows:

To the American Street Railway Association—Gentlemen:

The report of your Executive Committee will consist, as in past years, of the minutes of the several meetings held during the year, which will show what has been done by your Committee.

MINUTES OF SPECIAL MEETING OF THE EXECUTIVE COMMITTEE HELD AT THE HOTEL BRUNSWICK, BOSTON, JANUARY 25 AND 26, 1898.

TUESDAY'S SESSION.

The President called the meeting to order Tuesday, January 25, 1898, at ten o'clock a. m.

Present: Albion E. Lang, President; T. C. Penington, Secretary and Treasurer; John A. Rigg, Robert McCulloch, Henry C. Moore and Robert S. Goff.

The Secretary-Treasurer presented a report of the financial condition of the Association to date; also list of members in arrears for

dues for 1897, and amount of exhibit space at Niagara Falls remaining unpaid. The report was received and the Secretary directed to collect unpaid dues and subscriptions for space.

Mr. McCulloch moved that the authority to inspect and approve all papers to be read before the Convention be vested in the President and Secretary. Carried.

The Committee took a recess, and under the escort of Mr. C. S. Clark and Mr. E. C. Foster, of the Local Committee, visited the halls of the Massachusetts Charitable Mechanics' Association. After inspecting the building the Committee returned to the hotel.

Mr. Rigg moved that the time of the next annual meeting of the Association be September 6, 7, 8 and 9, that being the only time the hall could be secured for the meeting. Carried.

Mr. Rigg moved that the Local Committee be instructed to secure the first and second floors of the building for exhibition purposes, with all the heat, light and power needed, together with the Paul Revere Hall for the meetings, and the banquet-room adjoining for the meetings of the Accountants' Association. Carried.

The Secretary was authorized to notify the Secretary of the Accountants' Association that a room had been secured for their meetings.

Mr. McCulloch moved that the price for space be the same as last year—ten cents per square foot. Carried.

Mr. Rigg moved that the salary of the Secretary-Treasurer be $1,500.00 for the coming year, the same as last year. Carried.

The Treasurer presented a bond of the American Surety Company of New York for $5,000.00, which was accepted and delivered to the President.

The Local Committee was invited to the meeting to confer on the subject of hotels, rates, etc. After much discussion the Hotel Brunswick was made the headquarters of the Association; the management agreeing to make material reductions in rates, etc.; the hotel to furnish a banquet for seven dollars per plate, which should be satisfactory to the Local Committee, who would take charge of the same.

Mr. McCulloch moved that no rooms be assigned in the hotel until March 15, and that Mr. Goff represent the Executive Committee to assist Mr. Barnes, of the hotel, in filling the applications that have been received by that date. Carried.

Adjourned until 3:00 p. m.

Convened at 3:00 p. m.

The Secretary read a letter from Mr. H. F. MacGregor, General Manager Houston Street Railway Company, Houston, Texas, in regard to lighting auditoriums at pleasure resorts from street railway circuits, which was in substance the same as presented at a meeting of the Executive Committee at Niagara Falls last year. After discussion, in which one member said in his town they were allowed

to do it, and another that they were not, the Secretary was instructed to notify Mr. MacGregor that the Executive Committee considered the issue entirely local and they did not think that they should take any part in it.

Mr. McCulloch moved in regard to banquet tickets that the custom of former years be followed, to-wit, "There shall be two tickets issued to each member Company of the Association when there are two or more official representatives; when there is only one representative, only one ticket, and when a Company is not officially represented, no ticket shall be issued on account of said Company." Carried.

Adjourned to Wednesday, January 26, at 10:00 a. m.

WEDNESDAY'S SESSION.

Convened at 10:00 a. m.

Present: Same as before.

After much discussion in regard to subjects for papers to be read at the next Convention the following were selected:

1. "To What Extent Should Street Railway Companies Engage in the Amusement Business?"
   By Walton H. Holmes, General Manager, Metropolitan Street Railway Co., Kansas City, Mo.
2. "The Carrying of United States Mail on Street Railways."
   By W. S. Dimmock, General Superintendent, Omaha and Council Bluffs Railway and Bridge Co., Council Bluffs, Iowa.
3. "Comparative Earnings and Economy of Operation Between Single and Double Truck Cars for City Use."
   By Richard McCulloch, Electrical Engineer, Cass Avenue and Citizens' Railway Co., St. Louis, Mo.
4. "Inspection and Testing of Motors and Car Equipments by Street Railway Companies."
   By Frederick B. Perkins, Electrical Engineer, Toledo Traction Co., Toledo, Ohio.
5. "Cost of Electric Power for Street Railways at Switchboard; Both Steam and Water."
   By R. W. Conant, Electrical Engineer, Boston Elevated Railway Co., Boston, Mass.
6. "Maintenance and Equipment of Electric Cars for Street Railways."
   By M. S. Hopkins, Electrician, Columbus Street Railway Co., Columbus, Ohio.

Mr. Moore moved that the authors be requested to write papers that would not exceed thirty minutes in reading, and that they be present, if possible, to read them. Carried.

Mr. Goff moved that in case any gentleman selected should be unable to prepare a paper the President be authorized to select another to do so. Carried.

Mr. McCulloch moved that the thanks of this Committee be extended to the members of the Local Committee, especially to Mr. C. S. Clark, Secretary, for their care and attention to the wants of the Committee while in Boston. Carried.

Mr. Moore moved that the President and Secretary be authorized to perform any necessary work that would properly devolve upon the Executive Committee between now and the next meeting. Carried.

Mr. McCulloch moved that the Committee adjourn subject to the call of the President. Carried.

MINUTES OF SPECIAL MEETING OF THE EXECUTIVE COMMITTEE HELD AT THE HOTEL BRUNSWICK, BOSTON, SEPTEMBER 5 AND 6, 1898.

MONDAY'S SESSION.

The President called the meeting to order at 11:20 a. m.

Present: Albion E. Lang, President; T. C. Penington, Secretary and Treasurer; W. Caryl Ely, John A. Rigg, Edward G. Connette, Robert McCulloch, C. Densmore Wyman, Henry C. Moore, John M. Roach and Robert S. Goff.

The Secretary read the minutes of the Executive Committee meeting held January 25 and 26, 1898, which were duly approved.

The Secretary then read the report of the Secretary and Treasurer.

On motion the report of the Secretary and Treasurer was accepted.

The President appointed Messrs. Moore and Connette a Committee to examine the accounts of the Treasurer.

Mr. Ely moved that the Secretary be instructed to communicate with all members of the Association in arrears for dues for two years or more, and inform them that if they desire to continue their membership in the Association they must pay their dues at once; otherwise the matter will be submitted to the Association for its action; also that the Secretary quote the provisions of Article XVII. of the By-Laws in writing to such delinquents. Carried.

The Auditing Committee made the following report:

"We have examined the cash account of T. C. Penington, Treasurer, and find the same correct and supported by proper vouchers.

"HENRY C. MOORE,
"EDWARD G. CONNETTE,
"Auditing Committee."

Mr. McCulloch moved that the report of the committee be received and the committee discharged. Carried.

Mr. McCulloch moved that the President be authorized to appoint such committee as he may deem proper to prepare memorials upon members who had died during the year, as reported by the Secretary. Carried.

The President appointed Messrs. McCulloch and Wyman as such committee.

Mr. McCulloch moved that the Executive Committee recommend to the Convention the adoption of the following rules:

RULES OF THE CONVENTION.

1. No member will be recognized by the President unless he shall announce distinctly his name and address.

2. Speeches will be limited to ten minutes unless the time shall be extended by the Convention.

3. Members who desire to offer resolutions or other matters to be considered by the Convention are requested to submit them in writing, over their signatures, to the Secretary. Adopted.

Mr. McCulloch moved that the President be authorized in his discretion to consult with the Local Committee as to sending an invitation to the National Railroad Master Blacksmiths' Association, now convened in Boston, to inspect the exhibits. Carried.

Mr. McCulloch moved the adoption of the following resolution:

Resolved, That the Secretary be authorized to issue complimentary banquet tickets to the speakers and their ladies, and also to guests invited by the Massachusetts State Association, not to exceed thirty in number. Carried.

Mr. Wyman moved that the compensation of Mr. Albert L. Knox, Superintendent of Exhibits, be one hundred and fifty dollars. Carried.

The President read a letter from Prof. W. E. Goldsborough, of Purdue University, Lafayette, Ind., calling attention to the electrical engineering testing department and laboratory in the University.

Mr. McCulloch moved that the communication be received and referred to the President. Carried.

The Secretary stated that the President and Secretary had read the papers to be presented at the Convention, and that there was nothing in the papers in the nature of an advertisement.

The President appointed Messrs. Ely, McCulloch and Roach a committee to draft a suitable resolution, to be presented to the Convention, covering the matter of holding the meeting earlier than the date prescribed by the By-Laws.

On motion, adjourned until 10 o'clock Tuesday morning.

TUESDAY'S SESSION.

The President called the meeting to order at 10:30 a. m.

Present, Albion E. Lang, President; T. C. Penington, Secretary and Treasurer; W. Caryl Ely, John A. Rigg, Edward G. Connette, Robert McCulloch, C. Densmore Wyman, Henry C. Moore, John M. Roach and Robert S. Goff.

The Secretary read the minutes of the Executive Committee meeting, held September 5, 1898, which were duly approved.

Mr. Ely presented the following:

Pursuant to authority conferred upon this committee by the Convention of 1897, an investigation of the question of municipal ownership has been instituted, and in response to inquiries sent out by the Secretary, much valuable data and information upon the subject has been secured. But, owing to the extent of the field necessary to be covered, and also to the desirability of absolute accuracy in the evidence to be presented, and in order that the form of its presentation shall be such as to order of arrangement, conciseness of detail, etc., as to render the same of the greatest value, it has been thought best to ask for further time in the matter and your committee would therefore recommend that the subject be left in the hands of the committee until the next annual Convention, and in the meanwhile any member so desiring may have access to the data in the possession of the Secretary in its then existing form.

Mr. Roach moved that the foregoing be adopted and made part of the minutes. Carried.

Mr. McCulloch desired it to be recorded that, as an evidence of the activity and life of the Association, every officer and member of the Executive Committee had attended the meetings of the Executive Committee at Boston at this time, something unprecedented in the history of the Association.

On motion, adjourned.

The President—Gentlemen, you have heard the report of the Executive Committee. What action will you take thereon?

Mr. Hamilton, St. Louis—I move that the report of the Executive Committee be received and approved; and the recommendations presented be concurred in, and that the thanks of the Association be extended to the officers and Executive Committee for the very able manner in which they have conducted the business of the Association for the past year. Carried.

The President—We will now listen to the report of the Secretary and Treasurer.

REPORT OF THE SECRETARY AND TREASURER.

The Secretary read the report as follows:

To the American Street Railway Association—

Gentlemen: Your Secretary and Treasurer respectfully submits the following report:

Cash on hand October 18, 1897	$2,931.48

RECEIPTS TO SEPTEMBER 1, 1898.

Annual Dues	$4,131.67	
Membership Fees	300.00	
Space, Exhibit Hall, 1897	1,727.50	
Space, Exhibit Hall, 1898	217.00	
		$6,376.17
		$9,307.65

EXPENSES TO SEPTEMBER 1, 1898.

Printing and Stationery	$1,257.67	
Postage	198.58	
Salaries	1,500.00	
Miscellaneous Expenses	25.00	
Executive Committee, 1898	360.90	
16th Annual Convention, 1897	1,920.74	
17th Annual Convention, 1898	388.48	
		5,651.37
Cash in Bank, September 1, 1898		3,656.28
		$9,307.65

Chicago, September 1, 1898.

I hereby certify that the balance due the American Street Railway Association on the books of The Continental National Bank of Chicago, at the close of business on the first day of September, 1898, was three thousand six hundred fifty-six and twenty-eight-one hundredths dollars ($3,656.28).

(Signed) IRA P. BOWEN, Ass't Cashier,
Continental National Bank of Chicago.

MEMBERSHIP.

October, 1897	161
New Members to September 1, 1898	14
	175

LOSS.

Withdrawn	9
Consolidation	8
	— 17
Membership September 1, 1898	158

NEW MEMBERS.

The new members acquired up to the time of the last meeting are as follows:

Anderson, Ind.—Union Traction Co.....
Atlanta, Ga.—Atlanta Railway Co.....
Binghamton, N. Y.—Binghamton Ry. Co.....
Brooklyn, N. Y.—Nassau Elec. R. R. Co.....
Buffalo, N. Y.—Buffalo Traction Co.....
Chester, Pa.—Chester Traction Co.....
Cleveland, Ohio—Akron, Bedford and Cleveland R. R. Co.....
Colorado Springs, Colo.—Colorado Springs Rapid Transit Co....
Middletown, N. Y.—Middletown-Goshen Traction Co.....
Saginaw, Mich.—Union Street Ry. Co.....
Sioux City, Iowa—Sioux City Traction Co.....
Wakefield, Mass.—Mystic Valley Ry. Co.....
Wakefield, Mass.—Wakefield and Stoneham St. Ry. Co.....
Webb City, Mo.—Southwest Missouri Electric Ry. Co..... 14

WITHDRAWN.

The following members have withdrawn since the last meeting:

Atchison, Kan.—Atchison Ry. Light and Power Co.....
Buffalo, N. Y.—Buffalo, Bellevue and Lancaster Ry. Co.....
Chicago, Ill.—Cicero and Proviso Elec. Ry. Co.....
Middletown, N. Y.—Middletown-Goshen Traction Co.....
Montreal, Can.—Montreal Park and Island Ry. Co.....
New York, N. Y.—Dry Dock, East Broadway and Battery Ry. Co.
St. Paul, Minn.—Twin City Rapid Transit Co.....
Terre Haute, Ind.—Terre Haute Elec. Co.....
Cincinnati, Ohio—Cincinnati Inclined Plane Ry. Co..... 9

LOSS BY CONSOLIDATION.

Following is a list of companies lost by consolidation since the last meeting:

Baltimore, Md.—Baltimore Traction Co.....
Baltimore, Md.—City and Suburban Ry. Co.....
Pittsburg, Pa.—Allegheny Traction Co.....
Pittsburg, Pa.—Central Traction Co.....
Pittsburg, Pa.—Duquesne Traction Co.....
Pittsburg, Pa.—Pittsburg Traction Co.....
Pittsburg, Pa.—Pittsburg, Allegheny and Manchester Traction Co.
Pittsburg, Pa.—Second Avenue Traction Co..... 8

DUES UNPAID.

Detroit, Mich.—Wyandotte and Detroit River Ry. Co.	$ 25.00
Great Falls, Mont.—Great Falls St. Ry. Co.	50.00
Kalamazoo, Mich.—Citizens Railway Co.	50.00
Lock Haven, Pa.—Lock Haven Traction Co.	25.00
Newburyport, Mass.—Newburyport and Amesbury Ry. Co.	50.00
Oil City, Pa.—Oil City Ry. Co.	25.00
Steelton, Pa.—Middletown, Highspire and Steelton Ry. Co.	50.00
West Superior, Wis.—Superior Rapid Transit Co.	50.00
	$325.00

1897 CONVENTION SPACE UNPAID.

Diamond Truck and Car Gear Co., New York.	$ 60.00
Graham-Woodward Equipment Co., New York.	10.00
D. N. Long, Buffalo	5.00
Skeen Electric Signal Co., St. Louis.	20.00
	$ 95.00

IN MEMORIAM.

O, for the hour of rest,
When I shall lay my weary head beneath the sod—
My spirit to ascend to the presence of its God,
And dwell among the bless'd!

J. A. Stratton, Secretary and Treasurer,
Birmingham Railway and Elec. Co.,
Birmingham, Ala. — February 27, 1898.

Reuben F. Baker, President,
Columbia City Railway Co.,
Washington, D. C. — March 23, 1898.

Frank S. Stevens, President,
Globe Street Ry. Co.,
Fall River, Mass. — April 25, 1898.

Morris W. Hall, Secretary,
Camden and Suburban Ry. Co.,
Camden, N. J. — May 3, 1898.

Charles B. Pratt, President,
Worcester Consolidated Ry. Co.,
Worcester, Mass. — May 9, 1898.

Julius S. Grinnell, General Counsel,
Chicago City Railway Co.,
Chicago, Ill. — June, 8, 1898.

M. W. Squiers, Ex-Superintendent,
North Chicago St. R. R. Co.,
Chicago, Ill. June 20, 1898.

C. B. Reavis, Secretary and Treasurer,
Augusta Ry. and Elec. Co.,
Augusta, Ga. August 5, 1898.

Respectfully submitted,
T. C. PENINGTON, Secretary and Treasurer.

The President—You have heard the report of the Secretary and Treasurer. What is your pleasure?

Mr. Radel, New Brunswick—I move that the report be received and adopted. Carried.

The President—We have some letters of regret from gentlemen representing companies that are members of the Association, who are unable to attend the meeting.

LETTERS OF REGRET.

The Secretary read the following letters:

Augusta Railway and Electric Co.,
Augusta, Ga., September 3, 1898.

Mr. A. E. Lang, President, American Street Railway Association,
Boston, Mass.—

My Dear Sir: I regret exceedingly that the program I had marked out, which included attendance upon the Annual Convention, has been altered on account of the death of the Auditor of this road. I have not missed a meeting before for a number of years, and I shall be a great loser now, as I always secure an immense amount of valuable information by meeting with my friends and associates.

Please remember me most cordially to all my acquaintances, and with a sincere wish for the success of the organization, I am

Yours very truly,
D. B. DYER.

Bar Harbor, Me., September 5, 1898.

T. C. Penington, Secretary, American Street Railway Association,
Boston, Mass.—

My Dear Mr. Penington: I regret exceedingly that I shall not be able to attend the Convention. I am at Bar Harbor, Me., on a three months' leave to regain my health. I am doing splendidly

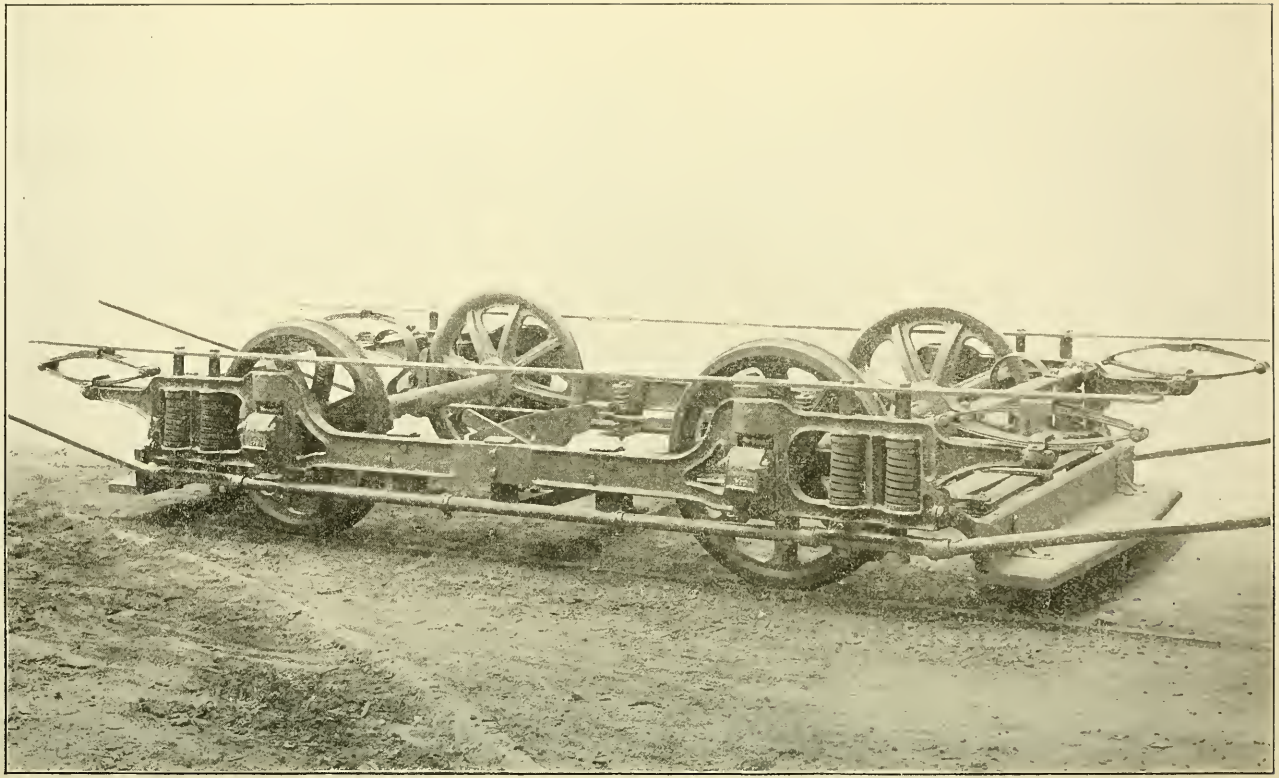


FIGURE I.

and begin to feel about as well as ever. I have been counting and expecting up to the last moment that I should be able to meet all my old railroad friends at the meeting. But I am afraid to take the chances with the excessive heat that they are having in Boston, so I must forego the pleasure. Please give my kind regards to all that inquire after me. I remain,

Yours very truly,

HENRY M. WATSON.

New York, September 5, 1898.

T. C. Penington, Esq., Secretary, American Street Railway Association—

My Dear Mr. Penington: I had for months promised myself the pleasure of accepting your cordial invitation to attend the present meeting of the Association, but am prevented by temporary illness. I know you will have a most interesting and profitable session and deeply regret I cannot be with you.

Please remember me kindly to my friends. With best wishes for all, I am, Yours truly,

C. B. HOLMES.

The President—The next business is the reports of special committees. We will now take up the first report, "Comparative Earnings and Economy of Operation Between Single and Double Truck Cars for City Use," by Mr. Richard McCulloch, Electrical Engineer, Cass Avenue and Citizens' Street Railway Companies, St. Louis, Mo.

REPORT OF THE COMMITTEE ON "COMPARATIVE EARNINGS AND ECONOMY OF OPERATION BETWEEN SINGLE AND DOUBLE TRUCK CARS FOR CITY USE.

Mr. McCulloch read the report as follows:

Mr. President and Gentlemen: Before beginning a discussion of this subject it would be well to define what is meant by single and double truck cars, as these terms are often very loosely used. In this paper a single truck car will mean one in which the body rests upon a truck, the axles of which are parallel with one another and at all times perpendicular to the center line of the car. In a double truck car the body is pivoted upon two independent trucks, each of which swings underneath the body with perfect freedom. Figure 1 is

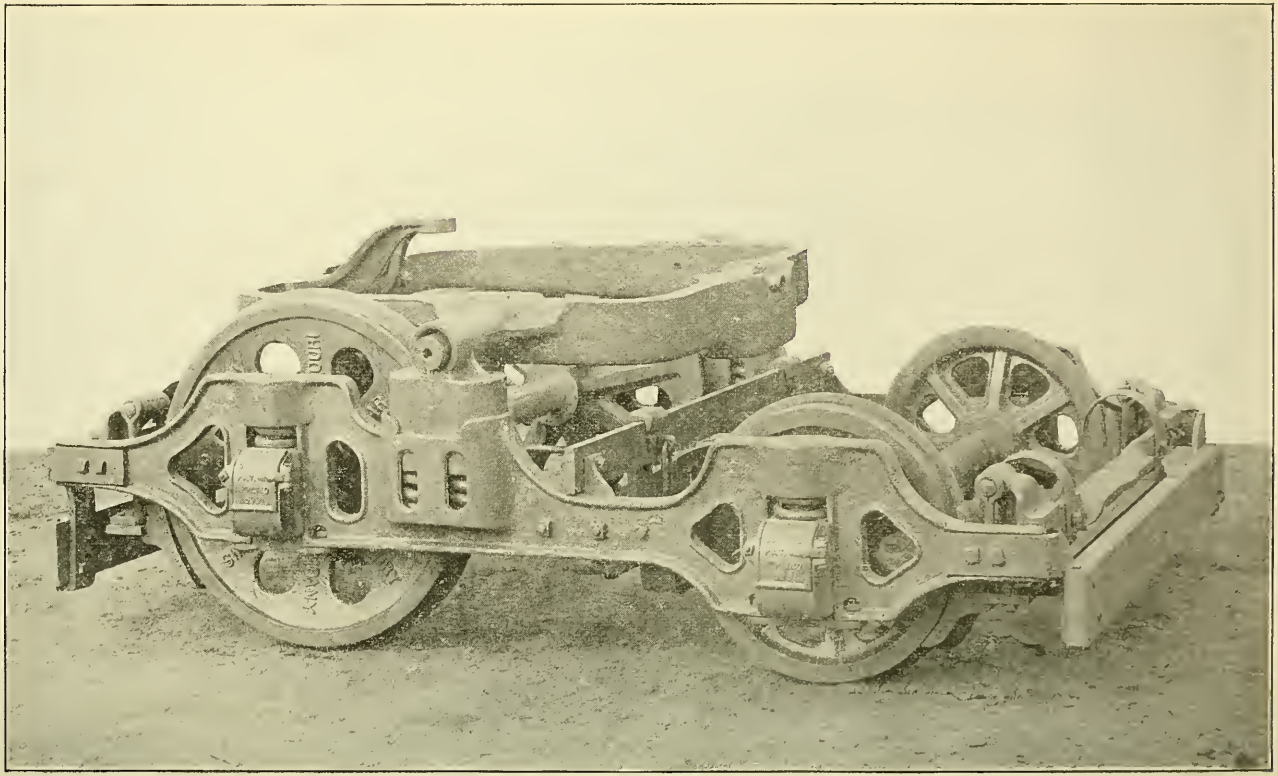


FIGURE 2A.

a photograph of an ordinary single truck, and Figures 2a and 2b show several forms of double trucks.

Double trucks for electric cars are of comparatively recent adoption. All of the early electric cars were equipped with single trucks, and in this horse car and cable car practice was followed. As the single truck was first on the ground, and at present largely has possession of the field, it will be assumed that in this case of the "Double Truck versus Single Truck" the double truck is the plaintiff and must submit the weight of the evidence.

Double trucks were first applied to cars in the desire to use longer bodies than has been customary. In the use of a single truck the best practice has been to limit the wheel base to about seven feet, as a greater distance than this would cause the wheels to bind in curves. Assuming that the body of the car is twenty feet long and that the platforms project four feet beyond the body, the end of the platform would overhang the axle ten and one half feet. This is as great an overhang as is customary, although single truck cars have been built with bodies longer than twenty feet. In this case it is necessary to provide extension springs on the trucks to check the oscillation of the car body. With a very long car body, however, the oscillation is not entirely overcome by this device, and the rocking becomes very disagreeable to passengers and very disastrous to the car and track. Twenty-two feet may be arbitrarily established as the limiting length of the body of a single truck car, and if we wish to use car bodies longer than this, we must adopt some truck which will avoid oscillation and which will pass around curves without undue use of power. The double truck accomplishes this and it was to enable longer bodies to be used that it first came into use.

The truck which was first used for long street railway cars was an adaptation of that used by the steam railroads. This truck contains four wheels of equal size and is pivoted over the center. It was soon discovered that for street railway use this form of truck had two very objectionable features: First, that the floor of the car must be high enough above the rail to allow the wheels to swing freely under the car, and, secondly, the motor being geared to one axle of the truck, only fifty per cent of the weight of the car was available for traction. The latter is a serious objection on roads having grades.

From what has been said it will appear that the single truck is the truck for short cars, and the double truck is the truck for long cars. Therefore, a discussion of the relative merits of these two types of trucks will involve a discussion as to the relative merits of short cars and long cars. Also, as it is customary to supply long cars with cross seats and short cars with longitudinal seats, we have instead of the comparatively simple subject of single trucks versus double trucks, which has been assigned to your committee, the more

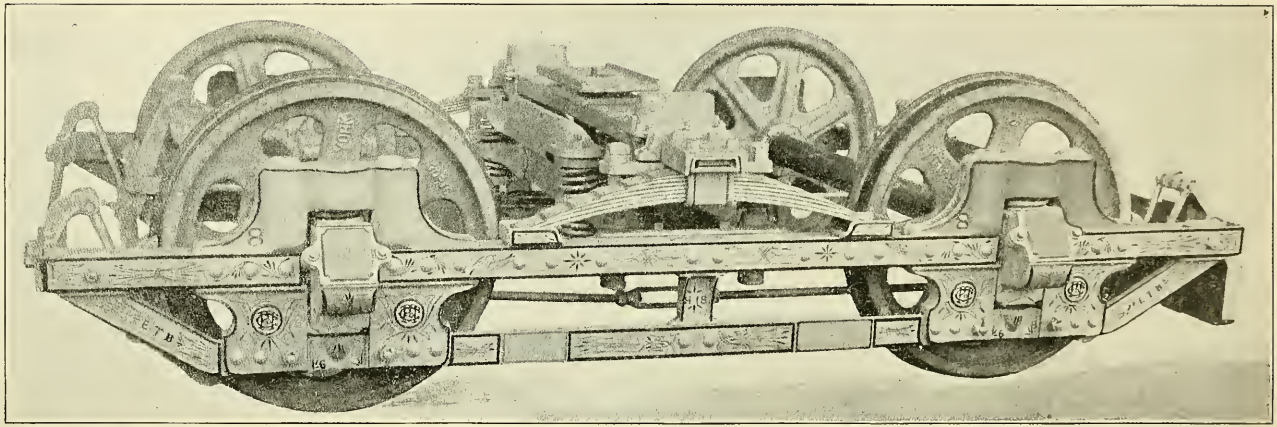


FIGURE 2B.

complicated struggle between the short car with single trucks and longitudinal seats and the long car with double trucks and cross seats.

It will be assumed in the discussion which follows that the road possesses the characteristic city travel, a load curve of which is shown in Fig. 3. It will be noted that two very pronounced peaks occur in this load curve, one in the morning from six to nine o'clock and the other in the evening from five to seven o'clock. It is at these times that the capacity of everything is tried. While the load curves of all city roads resemble each other, it is evident that local conditions will, to a large extent, determine the kind of car which the railroad company will operate. Some of these local conditions are:—the class of people who constitute the passengers, the location of the road with reference to the established lines of travel, the amount of pleasure travel received by the road, and the keenness of competition with other roads. The last is an important condition, because a road is sometimes forced to adopt certain measures for its protection which it would not adopt under any other consideration. In this discussion we will assume that it is to the interest of the road, even if no immediate competition exists, to use all reasonable endeavors to please its patrons, because this policy will render the road more ready to meet competition when it arises.

Before the advent of the electric car, the horse car had become such an established institution in this country that certain standards as to track and rolling stock had become fixed. In the matter of rolling stock, the size of the car had always been limited by the ability of two horses to draw it. When a mechanical motive power replaced the horses this limit disappeared, and almost the first improvement made in rolling stock was to increase the size of car bodies. Instead of bodies being sixteen feet long, electric cars were built with bodies twenty feet long, and now this length is being increased to twenty-eight and thirty feet.

The expenses of the average city road may be divided up as follows:

Maintenance of Way and Structures	4 per cent.
Maintenance of Equipment	7 per cent.
Conducting Transportation	52 per cent.
General Expense	8 per cent.
Fixed Charges	29 per cent.

It will be noticed that the item "Conducting Transportation" is more than one-half the total. This is largely made up of the wages of conductors and motormen and is proportional to the number of cars operated. Hence, it follows that if we may by the operation of larger cars cut down the number of cars, this account may be reduced in nearly the same ratio as the size of the car is increased. There are many other reasons why the size of cars has been increased, such as

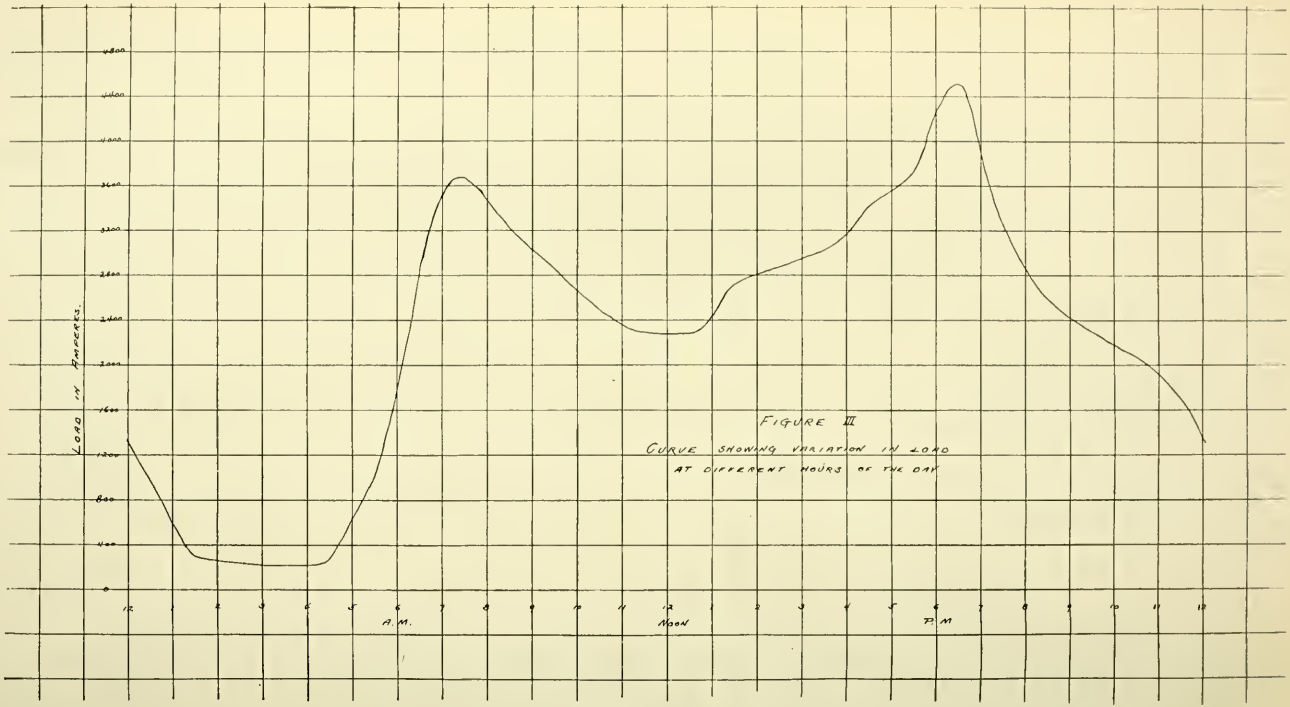

LOAD IN AMPERES.
4800
4400
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
A.M.
NOON
P.M.
FIGURE III
CURVE SHOWING VARIATION IN LOAD
AT DIFFERENT HOURS OF THE DAY

FIGURE 3.

the increased volume of traffic due to the higher speed and enlarged territory of street railroads, the greater comfort demanded by the traveling public, the increased power available for the operation of cars, etc.; but it is probable that the present tendency toward the increased size of car bodies is with a view of operating larger units and fewer of them.

A line operating small cars seating twenty-eight persons on a headway of three and one-half minutes would give the same service from a standpoint of seating capacity if it operated large cars seating forty persons on a headway of five minutes. Manifestly, this latter service would be preferable from the railroad standpoint for the reason just given, but the question is—Would the service be equally acceptable to the passenger? In this comparison we are assuming that the larger car is the more desirable vehicle in which to ride. Would the pleasure of the ride compensate the passenger for the greater length of time he would have to wait? This is a question which must be solved by each manager for his particular road, as its correct solution depends largely upon local conditions over which he has no control. The scrutiny with which a passenger chooses a street car varies with the length of his proposed ride. If the ride is to be short, he takes the nearest car without reference to comfort. But if he is to ride a long distance he will walk past several lines in order to choose that one on which he will have the most pleasurable ride. The car question then becomes a more serious one, with long roads and with roads catering to a pleasure traffic. It has usually been accepted that on those roads having a purely business traffic, the proper car is the short one operated on short headway. The author, however, is of the opinion that even in this case the long car operated upon somewhat longer intervals would be desirable. It has often been observed that where a line operates two sets of cars a passenger will allow several cars to pass him in order to patronize that type of car which suits him best. This has been observed even in the busy hours of night and morning when it would be fair to assume that passengers would be hurried and likely to take the first car which passes.

One of the most serious questions occurring in street railway practice is the problem of how best to take care of the rush of travel which comes morning and evening. With our present methods there are only two ways of taking care of this travel; the first, by increasing the number of cars or units in service; and the second, by increasing the capacity of each unit. The latter method consists of attaching a trailer to the motor car; and where this is done it is usual to increase the number of units in service. On first thought there would seem to be no better method of increasing the capacity of a road than by use of trail cars. They are easily attached and detached, they are in service only when necessary, and they do not require the assistance of additional trainmen. An examination of the trailer system, how-

FIGURE 4.

ever, will reveal the fact that it possesses serious defects. The trailer is not automobile and requires the services of men and horses to attach it to the cars and to move it between the car sheds and the motor cars. The opening between the motor and the trail car increases the danger of accident both to passengers and conductors. The number of entrances and exits is increased and this augments the work of the conductor in keeping track of his fares and increases the danger of his missing some of them. If an extra conductor is placed on the trailer to collect fares, a great portion of the gain due to the trailer system is lost. The use of trailers throws an additional strain on the motors, as a heavy weight is added to the train which is not available for traction. The trouble is intensified as the load on the trailer increases; it makes the train more unwieldy in handling, and is largely responsible for the difficulty in starting and stopping quickly and in making schedule time.

To obviate the necessity of using trailers, a large car equal in seating capacity to the combined capacity of motor and trail car may be operated. This system, however, introduces the disadvantage of the operation at all times of the day of a seating capacity needed only during a few hours of the day. It also increases the size and weight of the cars and the average power required to operate them.

In order to compare the relative economies of single and double truck cars, their advantages and disadvantages will be discussed with reference to the following points:

1. Wear and tear on trucks.
2. Wear and tear on motors.
3. Power required.
4. Wear and tear on track.
5. The use of trailers.
6. The seating arrangements and convenience of exit and entrance.
7. The preferences of passengers.

This relation will as far as possible be reduced to a money basis, and in order to do so a comparison will be instituted between a road which operates double truck cars and one operating single truck cars using trailers twenty-six per cent of the time to take care of the heavy night and morning travel.

The bodies of the double truck cars are twenty-six feet in length and contain eighteen cross-seats, seating thirty-six passengers. The trucks are of the maximum traction type. The empty car weighs 23,500 pounds; and the motors are G. E. 800. An illustration of this car is shown in Fig. 4.

The single truck car has a body twenty feet in length; it is equipped with longitudinal seats, and the entire car weighs 16,000

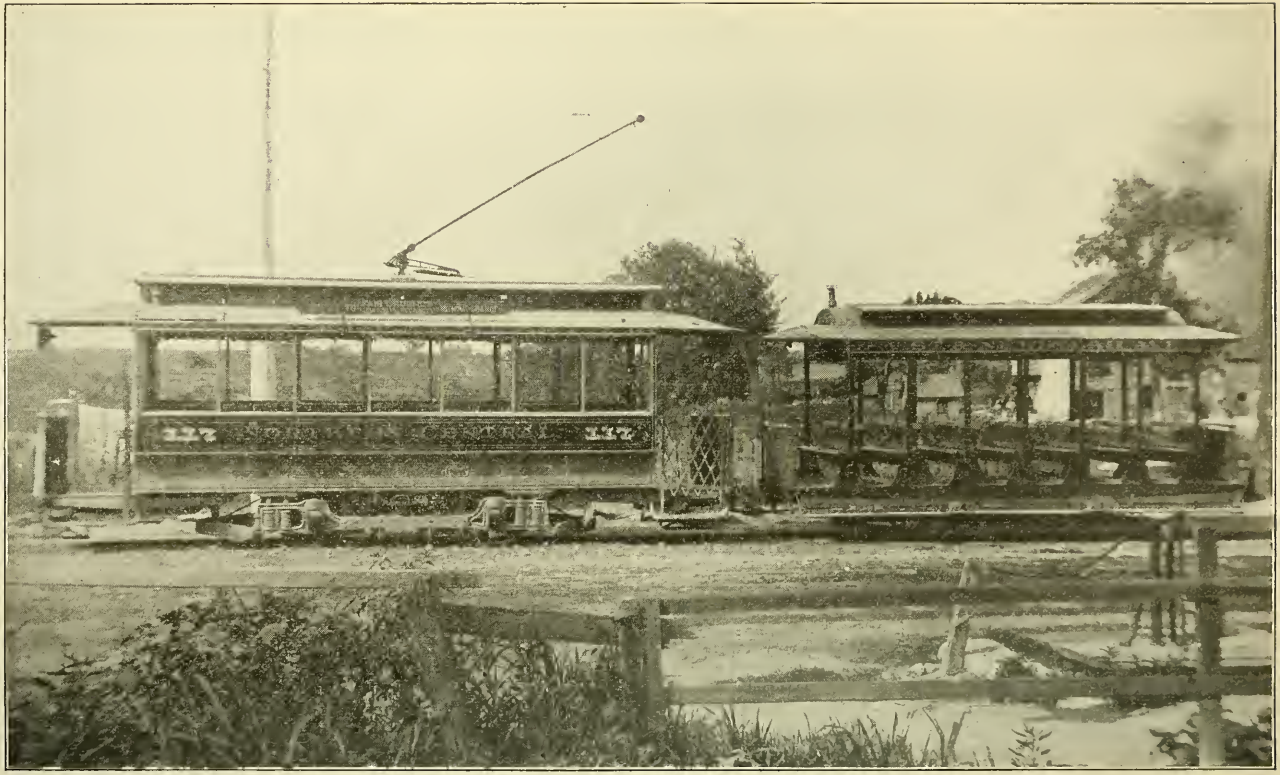


FIGURE 5.

pounds. It will seat twenty-eight passengers. During the period of heavy travel, which amounts to twenty-six per cent of the time, trailers are attached to these motors cars. Open trailers are operated in the summer months and closed trailers during the winter. The average seating capacity of the unit, estimating the trailer as a part of the car during the time that it is operated, is thirty-five seats, which approximates the seating capacity of the double truck car very closely. The motors in use on the single truck cars are W. P. 50.

The number of cars operated is obtained by dividing the daily car mileage by 115. It is necessary to do this because the average mileage per car on the two roads is different. The comparison is thus between seventy single truck cars and forty-seven double truck cars, each car making 115 miles per day. The road operating the double truck cars has the greater density of traffic. The single truck car with the trailer attached is shown in Fig. 5.

WEAR AND TEAR OF TRUCKS.

It is evident that since a car equipped with double trucks has eight wheels and one equipped with single trucks has four, the former will be the more expensive to supply with wheels. Table I shows the comparative replacement and cost of wheels and brake shoes on the two roads for one year. Table II shows the comparative cost of maintenance and repairs of trucks and motors for two years. It will be noted that while the cost per car is much greater on the road using double trucks, the cost per passenger is almost the same. It would not be fair to assume from these figures that the cost of maintenance of trucks and motors per passenger is always the same, no matter what sort of truck is used, because these figures result largely from the fact that in this particular case the double truck car carries the greater number of passengers, but an inspection of the table will emphasize the advantage of the large unit as compared with the small one. It will be seen by a reference to table I that the greater part of the increased expense of maintaining the double trucks is due to the renewals of wheels and brake shoes.

In examining the relative strength of the various parts of trucks, the side pieces may be compared to a beam supported at two points and carrying a concentrated load. The deflection of such a beam is proportional to the third power of the span; and in the analogy the span corresponds to the wheel base of the truck. Therefore, the shorter the wheel base, the stiffer the truck side, and in view of its long wheel bases it is evident that the single truck is at a disadvantage in this respect. For instance, a truck side where the wheel base is four feet and six inches is 3.76 times stiffer than a truck side of equal section where the wheel base is seven feet.

TABLE I.

Comparison of the cost of wheels and brake shoes on Double and Single Truck Cars for the year 1897.

	Average No. of Wheels used per car per year.			Cost per car per year.				Total Cost per car per year per 1000 passengers	Wheel Mileage.	
	33″	30″ Trailer.	24″	Wheels.	Labor in Replacing.	Brake Shoes.	Total.		33″	24″
Double Truck Cars (47)	8.72		7.06	$77.92	$17.36	$11.70	$106.98	$0.47	17260	20916
Single Truck Cars (70)	6.26	1.00		$40.93	$7.99	$4.30	$53.22	$0.38	25329	

The Double Truck Car has four 33″ wheels, four 24″ wheels, and eight brake shoes.
The Single Truck Car has four 33″ wheels and four brake shoes.
Average daily car mileage—115.

TABLE II.

Comparison of the cost of repairs and maintenance of trucks and motors on Double and Single Truck Cars for the years 1896 and 1897.

	Average passengers per car per year.	Truck Repairs.		Motor Repairs.		Total.	
		Per car per year.	Per car per year per 1000 passengers	Per car per year.	Per car per year per 1000 passengers	Per car per year.	Per car per year per 1000 passengers
Double Truck Cars (47)	226000	$181.00	$0.80	$319.00	$1.41	$500.00	$2.21
Single Truck Cars (70)	141000	$110.00	$0.78	$196.00	$1.39	$306.00	$2.17

G. E. 800 motors on Double Truck Cars.
W B. 50 motors on Single Truck Cars.

WEAR AND TEAR ON MOTORS.

Table II, to which reference has already been made, gives the comparative expense of inspecting, repairing and maintaining the motors of single and double truck cars. As in the case of the trucks it will be noted that while the expense per car is much greater in the case of the double truck car, the expense per passenger is nearly the same.

Table IV gives the relative weights carried by these different cars, when empty, seats full, and car crowded. It will be noted that while the percentage of weight available for traction in the case of the maximum traction truck remains constant, in the case of the motor and trailer it falls off as the number of passengers increases, and is especially small if the trailer is proportionately more heavily loaded than the motor car.

POWER REQUIRED.

Table III gives the power required to operate the different cars, and is the average of a long series of watt-meter tests. In making these tests the watt-meter was placed on a car in actual service and allowed to remain through the entire day. An examination of the tables will reveal the fact that the power required for the propulsion of the car and the care and repairs which the motors demand are much greater in the case of the double truck car. But if the number of passengers be taken into account, it is seen that the power and cost of maintenance are roughly proportional to the number of passengers carried with either style of truck.

WEAR AND TEAR OF TRACK.

The wear of the rails of a street railway track is due to the grinding action of the wheel on the rail, and this is proportional to the weight on the wheel, but is intensified by the dirt on the rail, which causes the wheel to slip and acts as an abrasive agent after the clipping has begun. The weak point of a street railway track, however, consists of the joints and the openings in the special work. The energy of the blow which a wheel strikes as it passes a low joint or a crossing is equal to the product of the weight of the wheel and the height of the drop. Therefore, on any given track both the wearing action of the wheel and the destructive action of the wheel are proportional to the weight which rests upon it. If the number of wheels under a car be increased, the number of blows which a low joint receives is also increased, but the intensity of each blow is diminished. Double trucks are at no disadvantage as compared with single trucks in this respect, unless the weight of the car be increased. Due to the shorter wheel base, double trucks go around sharper curves and go around the same

TABLE IV.

Comparison of weights carried by Single and Double Truck Cars.

	No. of Seats.	Total crowded capacity.	Weight empty.	Percentage of weight on driving wheels.			Pounds weight per seat.			Pounds weight per unit of total capacity.		
				Car empty.	Seats full.	Car crowded.	Car empty.	Seats full.	Car crowded.	Car empty.	Seats full.	Car crowded.
Single Truck Motor Car.	28	80	16000	100	100	100	572	702	943	200	246	330
Single Truck Motor Car with open trailer.	63	140	21000	76	67	67	334	463	622	150	210	280
Single Truck Motor Car with closed trailer.	48	125	21000	76	72	71	438	568	776	168	218	298
Double Truck Car.	36	110	23500	70	70	70	653	782	1050	214	258	344

Note.—Each passenger is estimated at 130 lbs.

TABLE III.

Comparison of the power required by Double Truck and Single Truck Cars.

	Average Watts.	Average Watt-hours per car mile.	Average Speed. Miles per hour.	Average Watts per seat capacity.	Average Watts per ton (car empty).	Average Watt-hours per car mile per 1000 passengers.
Double Truck Car. Seats 36—Weight 11.75 tons. Average for the entire day.	12040	1334	9.03	335	1025	5.9
Double Truck Car. Seats 36—Weight 11.75 tons. Average for the heaviest trip.	13080	1412	9.25	335	1025	
Single Truck Car—no Trailer. Seats 28—Weight 8 tons.	8471	921	9.20	303	1060	
Single Truck Car. Trailers operated 26% of the time. Average for the entire day.	9400	1110	8.42	254	1088	7.9
Single Truck Motor and Open Trailer. Seats 63—Weight 10.5 tons. Average for the heaviest trip.	12680	1440	8.84	201	1208	

curve with less output of power and less wear on the rail than single trucks.

The double truck fell into disrepute when the maximum traction truck was first exploited, on account of its liability to leave the track. This was due to the small amount of weight which was placed on the small wheels. It is now customary to place thirty per cent. of the weight on the small wheels, and with track in fairly good condition no difficulty is encountered in keeping cars on the track.

THE USE OF TRAILERS.

In the case of the two roads under discussion, the road operating single truck cars attaches trail cars to the motor car for two trips in the morning and two trips in the afternoon. For the entire year trailers were operated on twenty-six per cent. of the trips. Allusion has already been made to the use of trailers. The advantage of the trailer on this particular road arises from the fact that the load peaks are unusually sharp. The use of the trailer increases the capacity of each unit during the heavy hours of morning and evening travel and during rush travel due to base-ball games and races. On this particular road the motormen and conductors are paid ten cents per trip extra for all trips where a trailer is attached to the motor car. This expense largely offsets the value of this arrangement. There is no question that the use of the trail car increases the number of accidents for two reasons: First, because the trailer is another car; and, second, because the opening between the motor and trail car is a dangerous one for the passenger boarding or alighting from a car. It is impossible to estimate the money value of this accident liability, because in the case of many accidents it is difficult to determine what proportion of the damage was due to the trailer. Trailers must be switched at the ends of the roads and at the car sheds, and require men and horses for this purpose. The use of trailers also entails other expenses, such as car heating, cleaning, repairing and car license, which should be charged against the trail car system. To counterbalance all these disadvantages, the only advantage which the trail car system possesses is its flexibility.

THE SEATING ARRANGEMENTS: ENTRANCES AND EXITS.

As has already been stated, the cross-seat is used almost so universally in connection with the double truck car that it is fair to consider the economy and efficiency of cross-seats and longitudinal seats in connection with the discussion. There is no doubt that the cross-seat is preferable from the passenger's standpoint and the reasons for this preference are not difficult to analyze. Passengers often travel in pairs, and the cross-seat gives a privacy to their conversation

which is not possible with the longitudinal seat, the jerks due to the stopping and starting of the car are less disturbing to the passenger when he is seated facing the direction of motion, and the cross-seat renders it easier to look out of the windows.

If two car bodies of the same size are taken and cross-seats installed in one and longitudinal seats in the other, the car body equipped with the cross-seats will have the narrower aisle. This induces two disadvantages in the cross-seat car; one, that the crowded capacity of the car is less, and the other, that when the car is crowded the time consumed in loading and unloading is increased. The latter difficulty will be the more serious the shorter the haul and the greater the number of stops.

In the early days of the double truck car it was customary to mount the body high enough so that the wheels would swing under it. This gave the car a very unsightly appearance and made it difficult of access. Three steps were necessary to reach the platform, and as these steps were steep, this form of car was particularly objectionable to ladies. By the use of the maximum traction truck with 33-inch wheels, however, it is possible to lower the floor to within thirty-seven inches of the rail. By dropping the platform eight inches below the floor of the car it is possible to reach the platform by the use of a single step fourteen inches above the rail. This renders the car as easy of access as a single truck car. In the opinion of the writer the fact that the car floor may be made so low in double truck cars, is the chief advantage of the maximum traction truck.

It has been attempted to facilitate the loading and unloading of large cars by providing entrances and exits other than the rear door. This practice, however, brings about what is perhaps a more serious disadvantage, as it gives the conductor more than one door to watch, renders it difficult for him to keep track of his fares, and increases the liability of his starting the car before a passenger is on or off.

THE PREFERENCE OF PASSENGERS.

The preference of passengers, to which allusion has already been made, is undoubtedly in favor of the double truck car. In cities where the entire street railroad system is controlled by one company this point may not be considered of value, because passengers are obliged to ride in whatever conveyance the company chooses to furnish. However, the experience of roads which have changed their rolling stock from small, single truck cars to large, comfortable double truck cars is that the travel has shown an immediate increase. Part of this increase has been drawn from parallel roads, but part has been a created traffic. As the accommodations increase more people ride, and the regular patrons ride oftener. The street car ride, instead of being regarded as a necessary evil, comes to be looked upon as a pleasant part of the shopping expedition, the visit, or the picnic.

How great this created traffic will be depends upon the class of patrons served by the road and upon the terminal facilities of the line. The extremes of society, the very rich and the very poor, are not good riders, and it is probable that a road serving either of these classes entirely would get very little return for additional accommodations. The greatest increase would come from those who are now the best patrons of the street railroads, the fairly well-to-do middle class.

In this paper the writer has not attempted to prove that either the single truck or the double truck car is the better type. He has merely attempted to discuss the subject to bring out the strong points and the weak points of each type in such a way that the results may be applied to special and local conditions. Outside of the question of economy of operation, there are few roads on which the use of attractive, easy-riding double truck cars would not create a pleasure travel, especially in the summer season. In a general way it may be stated that the single truck car is more suitable for short hauls, dense traffic, many stops and low speeds. On the other hand, the double truck car is the more suitable for long hauls, high speeds, few stops, and pleasure travel. In the existence of either extreme condition, it would not be difficult to decide which care to use. It is in dealing with intermediate conditions that the manager must use his judgment.

Respectfully submitted,

RICHARD McCULLOCH.

DISCUSSION ON THE REPORT OF THE COMMITTEE ON "COMPARATIVE EARNINGS AND ECONOMY OF OPERATION BETWEEN SINGLE AND DOUBLE TRUCK CARS."

The President—This paper is certainly a very able and interesting paper, dealing with a subject in which we are all interested. Now let us have your views on the question. I hope that every member will discuss this paper.

Mr. McCormack, Borough of Brooklyn—Mr. McCulloch states in the paper that with the use of double-truck cars it would be possible to lengthen out the headway. I wish to state that on our road we have between three and four hundred double-truck cars, and in not a single instance have we been able to lengthen out the headway. The double-truck cars increase the patronage to such an extent that we have had to shorten the headway. One thing more, and that is,

when it comes down to standing loads and moving crowds yesterday (Labor day) I noticed on the cars seating forty passengers going to Coney Island that the average was sixty-five on the register. With a double-truck car, and a seating capacity of sixty, it is nothing unusual to see one hundred and twenty-eight and one hundred and thirty on the register; so you can see when you want to move large crowds, what the difference is with the double-truck car compared with a single-truck car. There are one hundred and seventy-eight double-truck cars running in the service on one line, and you can imagine what the travel is on that line.

Mr. Dimmock, Council Bluffs—What is the headway?

Mr. McCormack—The headway on the Court street line running from New York direct to Coney Island is less than one minute. On the Third avenue line it is three minutes nearly all day, and part of the time two minutes. The headway from Sixty-fifth street to Coney Island where all the Coney Island cars converge is about twenty seconds.

Mr. Sloan, Chicago—The double-truck cars are certainly coming into practice and favor, and it seems to me the main question is the question of traction. I have had no experience with double-truck cars, and I would like to know whether anyone who has had experience with them knows anything about how the motors work when four motors instead of two are used to get the maximum traction. It is a subject we should know more about, because in the use of the double-truck cars we are replacing the two motors with four.

REMARKS OF MR. JOHN I. BEGGS ON SINGLE AND DOUBLE-TRUCK CARS.

Mr. Beggs, Milwaukee—I think Mr. McCulloch has so thoroughly presented the case that there is very little more to be said upon it, particularly in behalf of the plaintiff. I do not think the writer of the paper evinced any partiality as between a single and double-truck car; but it is evident in what direction his sympathies lie. In the city of Milwaukee we have for three years been experimenting practically with

the advantages and disadvantages of single and double-truck cars. In 1896 there were put upon the system twenty double-truck cars with maximum traction trucks. These cars were equipped with eighteen double seats. A year ago, in view of our experience of a year in the use of the cars, we enlarged somewhat upon them, improved the trucks, we think, by abandoning the maximum traction truck and obviating what had been with us a very serious difficulty, namely, the pony wheels leaving the rail. We increased the length of the car and seat forty passengers by placing twenty double seats crosswise. During the present year we have benefited by our experience still further, and have increased the length of the body and enlarged the seating capacity without increasing the overall length, which is forty-one feet over bumpers. We maintain the same size of platform so far as the accommodations to passengers is concerned, by increasing the length of the body one foot, slightly moving the seats together and reducing the amount of the bumpers in front of the dash, so that with our present car, so far as our service is concerned, there is little left to be improved upon in our opinion. We seat forty-four passengers, having twenty-two double seats, placed crosswise.

Of course the use of the double-truck car is largely determined by local conditions. For the climate of Milwaukee double-truck cars are a necessity. Because of our short summer season, it is almost impracticable to maintain different equipment for summer and winter services. There are many reasons existing with us for the adoption of a standard car for use all the year round, among which are the short summer season and the likelihood of chilling winds and cold rains at any time in the warmest days of summer. We have now a car that suits us twelve months in the year. We have not had any difficulty with the matter of traction. We use a thirty-three-inch wheel in the equipment; we are having built and still maintain only a distance of thirty-two inches from the rail to the bottom of the sill; that was one of the difficulties we had to overcome. We did that by giving considerable attention to the matter of the construction and

framing of the car to permit the thirty-three-inch wheel to readily pass around our shortest curves. We are so thoroughly convinced as to the advantages of the double-truck car that we are gradually permitting all our single-truck cars to be worn out and scrapped as their life is brought to an end.

We have found that the use of double-truck cars has greatly increased the traffic; in other words, the people wait for double-truck cars on certain lines. We are compelled to place some of the single equipment on at times, but where the two types of cars are run on the same lines the people will wait for the double-truck car, for the reason that the riding is much more comfortable. Our double-truck cars on our lines ride almost as smooth as a Pullman sleeper. That, of course, depends largely on the character of the track; but on a large portion of our lines, particularly those where we are putting on the heavy equipment, we are having the joints cast-welded. We are doing away with the rocking and pitching motion of the car, and by the use of the double-truck are enabled to make much higher speed, which is the tendency of roads all over the country. We have to make higher speeds. We brought our averages up within two years certainly a mile an hour. Our average speed now is fully nine miles per hour. We would not be able to do that with a single-truck car, because of the oscillating motion and liability of the pitching to displace the trolley wheel, whereas with the double-truck cars we seldom have that trouble.

As to wear and tear, we believe the weight of evidence is in favor of the double-truck car. While we have double the number of trucks and double the number of wheels to maintain, the blow of the wheel at crossings and special work is so much easier that it does not wear the trucks nearly so much, and we find that our repairs of springs is possibly seventy-five per cent less on the double than on the single-truck. We have been able to increase our headway on most of the lines on which we have placed double-truck cars. In other words, we try to regulate the headway of the double-truck cars to meet the general conditions during the larger portion of the day; and during the rush hours morning and evening, par-

ticularly in the evening, we throw in intermediate cars, but still maintaining the regular headway of the regular equipment of the line. So far as the city of Milwaukee is concerned, we are very strongly impressed with the very great advantages of the double-truck car, many of which have been referred to indirectly in Mr. McCulloch's able presentation of the case, and we experience other advantages, which are governed by local conditions, and would not apply, possibly, in all cities even of the same population.

A question was asked as to the four-motor equipment. I might say that during the present year we have had constructed ten interurban cars, running between Milwaukee and Waukesha Beach, and the city of Waukesha, a distance of twenty-six miles. These cars were carefully constructed after careful investigation and the information we could get from electrical engineers. Based on this and our own experience and judgment, we have equipped them with four G. E. 1000 motors, geared to run thirty-six miles per hour, with 40,000 lbs. load. Our double-truck cars weigh about 35,000 lbs. With these four-motor equipments we have no trouble whatever from lack of traction, and we believe that in the very near future it will be advantageous for us to equip all our double cars with four motors. We have some grades which we climb with our double-truck cars, using 33-inch wheels, running as high as six and seven per cent. They do it with a little difficulty at certain times, and under certain conditions of rail and weather; but with our four-motor equipments we usually have no difficulty whatever in climbing the grades and in getting, we believe, very superior service.

I think, Mr. Chairman, that the case of the plaintiff, which Mr. McCulloch has been pleased to term the double-truck car, was so ably presented in his paper that it does not need any other advocate, but I should rather have denominated the double-truck car the defendant, because there have been so many attacks made upon it. I can only say, so far as we are concerned in the city of Milwaukee, that the double-truck car has come to stay. The character of the population you are serving has much to do with the discrimination that is shown

in the selection of a car. Some sections of the city do not pay much attention to it, while other sections discriminate, and just as we regard the pleasure and comfort of the riders, we find the traffic increases on those lines. I might say, as indicating the economy of the double truck, that on certain lines equipped two years ago with the double-truck cars we had previously maintained a headway of four and one-half minutes, and by the use of the double-truck car and the greater speed obtained, together with the greater number of passengers accommodated, on this line running through the better portion of the city, we have been able to gradually lengthen the headway to six minutes, without any complaint from our patrons. You can readily understand what that means in reduced equipment and consequently expenses. Quite recently, by a further increase in the speed, on a long line—our policy is to run lines from one extreme of the city to the other, for the comfort of the passengers and to avoid transfers—we have recently cut off another car and still maintain the headway at six minutes, by making the trip in ninety minutes instead of ninety-six minutes. I might say that in the same way, on the line last equipped with double-truck cars, we hope, by the increased speed made possible to maintain, that we shall be able to take off two of the sixteen cars on the line and not increase the headway. This is one of the very great economies which we are realizing throughout the system by the use of double-truck cars. We are able to run at very high speeds on our line from Milwaukee to Waukesha with double-truck cars, whereas with a single-truck car it would be hazardous. The experience of the city of Milwaukee is strongly in favor of the double-truck car. The latest improved truck permits us to use the 33-inch wheel with the same facility as the 30-inch wheel; that is, there is no greater height from the rail, and I think as soon as our necessities are known the manufacturers of trucks and cars will accommodate themselves to the new conditions and many present obstacles will be overcome.

Mr. Bean, St. Joseph—I move that the report be received and spread upon the minutes and a vote of thanks be extended to Mr. McCulloch for his able paper. Carried.

MEMBERS PRESENT WHO WERE AT THE ORGANIZATION OF THE ASSOCIATION.

Mr. Kelly, Columbus—It has been suggested that all the members of the Association who were present at the organization of the Association in Boston in 1882 will rise.

Mr. W. Worth Bean, St. Joseph, Mich.; Mr. George B. Kerper, Dayton, O., and Mr. Julius E. Rugg, Boston, Mass., were the only members present.

The President—I have received letters from some of our old members, who may have been at the organization meeting, indicating that they may be here before the meeting adjourns. Among them are Mr. H. H. Littell, Buffalo, N. Y.; Mr. Thomas Lowry, Minneapolis, Minn., and Mr. Henry C. Payne, Milwaukee, Wis.

ANNOUNCEMENT OF ENTERTAINMENT.

The Secretary—The excursion to Concord and Lexington will start promptly from the Union Depot at 2:30 o'clock. Special cars to the depot will leave the Hotel Brunswick at 2:00 o'clock. There will be a special train to take the party to Concord and Lexington, and everybody is invited to take the trip.

There will be a reception in this hall this evening from eight to twelve o'clock. The Boston people are anxious that all the members and their ladies shall attend, as they want to become acquainted with them. There will be music and dancing, and refreshments will be served. We hope you will all avail yourselves of these invitations.

Mr. Kelly, Columbus—Mr. President, I move that we adjourn until 10 o'clock to-morrow morning. Carried.

WEDNESDAY'S SESSION.

President Lang called the meeting to order at 10:30 a. m.

The President—The first business assigned for this morning is the paper by Mr. M. S. Hopkins on "Maintenance and Equipment of Electric Cars for Street Railways," but he is not

present. I am waiting for Mr. Kelly of the same city to return to the meeting room, when he will read the paper; and in the meantime we will transpose these papers, and have Mr. W. S. Dimmock, General Superintendent Omaha and Council Bluffs Railway and Bridge Company, Council Bluffs, Iowa, read his paper on "The Carrying of United States Mail Matter on Interurban and Street Railways."

Before proceeding to the reading of that paper, there are some announcements to be made.

The Secretary—I have been requested to read the following invitations:

INVITATION TO VISIT POWER PLANTS AND SHOPS OF THE BOSTON ELEVATED RAILWAY COMPANY.

The Boston Elevated Railway Company begs to call the attention of delegates to their desire to have those who wish to visit any or all of the various power plants, shops, car-houses, etc., admission to which will be granted to all wearers of the button of the Association. Special instructions have been issued to have particular attention shown to visitors.

Full information as to the best way of reaching the different plants can be secured at the bureau of information.

HARBOR EXCURSION AND CLAM-BAKE.

A special steamer will leave Rowe's wharf at 2:30 o'clock for a sail down the harbor and a clam-bake at Nantasket Beach. Special cars will leave Hotel Brunswick at 2 o'clock sharp.

INVITATION TO RIDE ON THE "CHUTES."

Boston, September 8, 1898.

Mr. Robt. Derrah, Mechanics' Building—

Dear Sir: I wish to inform you that I shall be glad to honor the badges of the delegates to the Convention for admission to "The Chutes," on Huntington avenue.

Very truly yours,

WALLACE E. HYDE.

Mr. Bean, St. Joseph—I move that the invitations be accepted, with the thanks of the Association. Carried.

The President—We will now listen to the paper by Mr. Dimmock.

REPORT OF THE COMMITTEE ON "THE CARRYING OF UNITED STATES MAIL MATTER ON INTERURBAN AND STREET RAILWAYS."

Mr. Dimmock read the paper as follows:

To the American Street Railway Association—

Mr. President and Gentlemen: During the meeting of this honorable body at Niagara Falls last year, I had the honor of making a few remarks with a view of bringing about a discussion upon the subject of electric railways carrying the United States mails; and while the discussion was brief for the want of time, it was at least the means of getting the subject before you during this Convention, and the only error the Executive Committee has made is in not giving this paper to some one with a wider experience and more competent to lay the subject before you. I consider it an honor, however, for any one to be called upon to address this Convention, and a duty which no one can afford to shirk so long as he is a member of the Association; therefore, if, in my attempt to lay a few brief statistics before you, I am able to bring forth some good discussions from the more experienced members, I feel the result will be a benefit to the Association and electric railway earnings in general.

There is probably nothing, or one might say, no one thing, which is of more importance to the perfection of an absolutely satisfactory mail service than the saving of time; the electric cancelling machine and the numerous contrivances of the manufacturer's craft employed in the handling of mail matter, all aim at the one end, economy of time. This is probably the most potent argument in favor of the electric car service for the transmission of mail matter to and from depots, sub-stations and suburban stations to the main postoffices. As a general proposition, the schedule time of the electric cars is absolutely to be depended upon; experience has demonstrated that the list of casualties likely to interfere with the progress of an electric car upon its designated route is smaller than that which often hinders the wagon service. In the case of the Omaha office, where I have had the best opportunity for observation, a noticeable gain is made in the service between Omaha and Council Bluffs, a distance of five miles, and Omaha and South Omaha, of the same distance; hence the advantage is not confined to the saving of time, but in the increased number of dispatches it is possible to make. The frequency

and regularity of movement on the electric car lines makes it possible to dispatch mail matter from one office to another, or from the main office to sub-stations, to the best possible advantage, since the time can be regulated by the dispatching office at will in order to make certain outgoing trips of carriers, which might be impossible to reach if the regular running time of the regular mail trains must be considered, or the possibility of using the wagon service. Before the use of the car service for this purpose, and when the railroad had to be depended on for the transmittal of mail between Omaha and Council Bluffs, Omaha business men frequently asserted that it was easier and more satisfactory to transact business by letter with Chicago than with Council Bluffs; almost as broad a statement might be made in regard to South Omaha. As an example of the difference in the two modes of service, the Denver fast mail reaches the Omaha office via the electric cars at 4:18 P. M., gets into the hands of the city distributors from ten to fifteen minutes sooner than when the wagons are depended on. This means the handling of an immense number of letters which reach the carriers in time to be taken out on their last afternoon trip, thereby being delivered to the patrons of that office on the afternoon of the same day, instead of the following morning, and preventing a delay of something like seventeen hours. This great advantage, of course, relates to letter mail, which is the first to be considered. The advantage is obvious if you happen to be in a position to observe the difference in time when the letters are conveyed by the cars, as contrasted with that at which the wagons deliver the papers brought by the same train; in the interim between the two deliveries, the letters have been tossed on the table, back-stamped, and have found their way into the deft hands of the distributors and are being rapidly thrown to their ultimate destination.

One can only realize the vast importance of ten or fifteen minutes under certain conditions when he has missed a train by five minutes, or realizes what can be accomplished in the same time after he has watched the distributing of a fast mail; what hours and days are to man, moments are to letters. A clerk in the Omaha office said to me recently: "The return to wagon service from the electric car system would be a plunge backward into the dark ages, which I trust we will never experience." Mailing clerks and distributors alike are unanimous and even enthusiastic in their commendation of the electric cars as a means of transit for mail matters, so far as I am advised.

Where sub-stations are supplied from a main office, the advantage of the cars admits of no question; the time saved in the actual transmission of the mail, to and from, is about one-half, so that where carrier service enters in as a means to be considered, the patrons of the outlying districts are given an immeasurably better and more satisfactory service. When this great system shall be utilized everywhere for the collection of mails over the cities, when the actual labor

of "working" and routing of the mail shall be performed on the postal electric cars as they thread their way through the very heart of commerce, and a letter finds its way yet warm from the hands of the writer, to the depths of the mail pouch, then it will seem as if system could reach no higher pinnacle of development, unless, indeed, we learn to transmit mail sacks by the very lightnings of Jove.

I wish to make another comparison of time saved by using the electric railways to carry mails. Before the electric line between Omaha and Council Bluffs undertook to handle the mails between these cities, the mails left the main postoffice by wagon and were conveyed to the depot of the Union Pacific Railroad, which is a distance of a mile in Omaha and one mile and eight-tenths in Council Bluffs, where they were then conveyed by train across the river, a distance of five miles. The Union Pacific at this time had about eleven trains in twenty-four hours, and part of these trains were at night after business hours were over for the day, thereby making the mail service so very unsatisfactory that the public began to clamor for the mail to be carried by the electric railway from the time the road was opened. We finally made a contract with the government to carry the mails between the two cities, and the public discovered at once that we were transporting these same mails from Council Bluffs to Omaha in the same time it formerly took to deliver the mail by wagon from the Council Bluffs postoffice to the Council Bluffs depot; thus saving the time consumed by the Union Pacific train between the cities, and time consumed by wagon from depot to postoffice in Omaha. In fact, the mail was probably in the hands of the addressees and answered in some cases long before it had crossed the river by the old route. Or a man could mail his letter in Council Bluffs, walk to Omaha and wait for its delivery under the old system, while the new route makes it possible for him to mail a letter when he goes to his office in the morning and get his answer by noon. No doubt an investigation would prove that the same conditions exist in nearly every State in the Union at hundreds of places. This being true, we have shown the value of the service.

Now let us investigate the compensation. After it was discovered that the electric railways could handle the mails with so much satisfaction to all concerned, the managers of the railways thought they saw in the government a great protection during strikes, and were ready to carry the mails at almost any price; but I believe experience has taught us, through some of the strikes in the East, that they did not find the protection anticipated. The electric railway managers were figuring on the basis of what the government had done for the steam roads during such troubles, and while seemingly the comparison was a good one, it is erroneous from the fact that a mail car could be attached to an engine hauling ten or fifteen coaches of passengers and this one train would perhaps clear up the traffic for hours,

while with the electric roads, where the headway is anywhere from two to five minutes in large cities where strikes are liable to occur, one train carrying the mail which the government would protect would make no more impression upon a congested travel than would one drop of water in the ocean. Therefore, it can be shown that the only benefit received by the companies for carrying the mails on street and interurban railways is the compensation allowed by the government for the same; hence the railways should work with the end in view to make this compensation enough to justify them in looking upon the carrying of mails as a profitable business and one which should receive their careful attention. It is true the government has made some effort to arrive at the cost of carrying the mails. If you will read the report of the committee to the Postmaster General under date of June 25, 1896, which the government officials at Washington will furnish you upon request, and which contains a great deal of valuable information, you will see the report treats mostly upon finding out what expense the railways are put to in handling the mail and not upon how much the value of the same is to the public. This report makes an allowance of three cents per mile for carrying pouches upon electric trains, while in the same report they state as follows: "The closed pouches upon the street cars should be compared with the Star service which it replaces." In the same breath the government states: "The Star Route service costs four and ninety-four-hundredths of a cent per mile," while they recommend three cents per mile only for the electric service, with its increased speed, more prompt and reliable handling; and, in fact, a superior service in every sense of the word. Following this statement they also say: "It is gratifying to report that the improved service will not materially increase the expenditures of the postoffice department." Why? Because we, the managers, have allowed them to dictate to us what we should have dictated to them, and they offer us for a better service less than they have paid for the same service by wagon, simply on the ground that said service costs us but little, if anything; yet in figuring what it costs us they do not take into consideration, as a rule, any expenses for damages, general expenses, and especially fixed charges. Where the regulation wagon service in various cities is costing the government fifteen and seven-tenths cents per mile traveled, they only offer the street railway companies sixteen cents per mile for a sixteen-foot car, and at the same time admit the service will be far superior and that the said car will take care of the natural increase for years to come. Does it not look unreasonable for them to dictate to the railway companies such terms when the service is so much superior to the wagon service? Why, in Council Bluffs they pay more for the wagon service to haul the mails to and from the depot, a distance of one and eight-tenths miles, than they pay the steam road for hauling it from Council Bluffs to Omaha. Why?

Simply because the steam roads are post roads and are compelled to carry the mails as the government dictates, while in the wagon route they are dealing with an individual, and it is impossible for them to make a contract for any such unreasonable terms.

When the Omaha and Council Bluffs Railway and Bridge Company first closed the contract with the government for carrying the mails between Omaha and Council Bluffs the government allowed this company one hundred dollars per month, and was satisfied it was getting value received, until other electric roads commenced to carry the mails more for protection than revenue, when the government immediately took advantage of the time and opportunity to make an investigation, of which the report of June, 1896, was the result, which reduced our compensation to fifty dollars for nearly the same service. Had the American Street Railway Association handled the matter in the past, as general managers and passenger agents of steam roads handle their affairs, the result of the government committee's investigation would have been different.

No doubt the companies spoken of in the committee's report to Postmaster General Wilson, under date of June 26, 1896, where they give information as to the cost of carrying mails and operating mail cars, have since then learned through experience that their estimates were entirely too low, although given in good faith at the time. The Chicago City Railway states that the revenue derived from running mail cars barely pays the expense. Nearly every manager with whom I have communicated is dissatisfied with the remuneration received. And here allow me to add that the running of mail cars in large cities, like New York and Chicago, is of vastly more importance to the government than they are willing to admit; while, on the other hand, to run these cars on regular trains is annoying to the passengers from the fact that where they are supposed to stop at sub-stations, connecting points, etc., the passengers are annoyed by the wait of a minute or so, and the result is the car is run as a special exclusively for mail, making it more costly to operate. Yet the government is basing the compensation upon the same basis as postal cars for steam roads; and we, as managers of electric roads, are allowing it to be done with all statistics before us to prove that the steam roads are not securing the remuneration they should. To prove this, I respectfully refer you to some excellent articles in detail upon this particular subject in the "Railway Age," published at Chicago, December 31, 1897, and March 11, May 20 and 27, 1898. It would be worth the time of any member of the Association to procure and digest the articles referred to, as time would not permit of repeating them in full here. Congress has already appointed two commissions to investigate this subject, one known as the Gardner-Hubbard commission of 1877, and the other as the Elmer commission of 1884. These commissions made elaborate reports advocating increased pay

based upon speed and space. The recommendations were not acted upon for the reason that the railroad companies themselves, without extra pay, have been found to increase their speed and enlarge their space, and thus the government has actually received these advantages under the operation of the law as it stands. The steam roads had done more than their part, while the government took advantage of it and refused to act. The government has always been in the position of a beggar regarding facilities demanded of the steam roads for handling the mail.

In December, 1897, a great cry went up from Washington as to how the steam railroads were swindling the government. This led to an investigation, and had I time I would like to quote the results of that investigation in detail. Suffice it to say, that this charge was ably answered by Mr. E. P. Ripley, President of the Santa Fe Railway system, and the charge denied by the Chicago Times-Herald, and the sum and substance was that the government was making thousands of dollars off the railways through the arrangements of only weighing mails every four years and obtaining car space unpaid for. For illustration, in these statements sent out from Washington, it was claimed "that the amount paid by the government to the Erie road for the transportation of mails had been sufficient to pay a dividend of eight per cent. per annum upon all the stock of the road." The stock of that road is $150,000,000; six per cent. per annum would be $9,000,000; the total mail pay of the Erie road is less than $500,000. Such statements as these place this matter in a false light, and if after years of experience the steam roads are not in a position to obtain proper rates for handling mails, what will be the condition of affairs between the electric railways and the government, if no effort whatever is made upon the part of the management of the electric railways to look after this matter now? I realize that it is a hard matter for the government to make a flat rate to cover all roads and the local condition pertaining to each road; but as they have attempted to do this, I claim that they should have made the rate flattering enough to the electric railroads to make them at least interested in the subject, and that three cents per mile for pouch service and sixteen cents per mile for sixteen-foot cars, which are fast becoming obsolete and replaced by cars from one-third to twice as large, is not enough. The government will naturally take advantage of the larger cars, as they did where advancement compelled the steam roads to increase the size of their cars, speed, etc., but I doubt if they will increase the compensation for electric roads or take this question into consideration when figuring on cost of operation.

It is not for me to say how much we should receive, but for the members of the Association to take up the subject by discussion and work it out. This class of service is in its infancy; it will grow from year to year, and after a while be worth thousands of dollars to

us annually, and what we do to-day, and what we neglect, is laying the foundation for the government to work upon in the future. Thus it behooves us to be on the alert and lay the foundation of the compensation so well that the government cannot tear it down when the time comes for them to declare the electric railroads as post roads, etc.

For the present we are compelled to abide by the appropriation of Congress and the rates made by them; but the question before us is how can matters be improved upon to benefit the electric railways in the future? This Convention represents as many millions of dollars of investment, I believe, as any other body of men coming together each year in this country. They are men whose power can be felt in every community. In unison there is strength, and if you, gentlemen, will take up this subject, discuss it thoroughly, and when you have reached an understanding go home and lay the matter before the Congressmen from your district, convincing them of the good the electric railways can be to the public in carrying the mails, as well as themselves, to their very door, with promptness, frequency and dispatch, even though these homes may be in the rural districts surrounding our cities and towns, it will only be a question of time when the influence of these efforts will be felt at Washington, and something more substantial than glory and patriotism will be our reward for carrying the United States mails.

Respectfully submitted,
W. S. DIMMOCK.

DISCUSSION ON THE REPORT OF THE COMMITTEE ON "THE CARRYING OF UNITED STATES MAIL MATTER ON INTERURBAN AND STREET RAILWAYS."

The President—Gentlemen, you have heard this very interesting paper on this important topic. The matter is now open for the fullest discussion.

Before the discussion opens I will ask Mr. Henry C. Payne, of Milwaukee, Wis., one of the ex-Presidents of the Association, whom I notice has just entered the room, to take a seat upon the platform.

REMARKS OF MR. CHARLES S. SERGEANT ON "THE CARRYING OF UNITED STATES MAIL ON STREET RAILWAYS."

Mr. Sergeant, Boston—Mr. President, I should like to say a few words on the subject of this paper. I have been very much interested in the matter, and I heartily endorse all that

the writer has given us. I have some data of our experience in Boston, which I thought might be of interest to the members. In 1895 our company in Boston was approached by the postoffice department to see what could be done in the establishment of a trolley mail service, but, as the writer of the paper has said, there was not sufficient money available for the purpose except funds left over from the "wagon fund." We undertook to inaugurate the service, and take what revenue might be gotten by a transfer from this fund, as a test of the feasibility of the scheme. This was the first city in which the trolley mail cars were handled in the same manner as the steam railway mail cars, that is, with a messenger and clerks to assort the mails on the car. We began in 1895 with seven mail cars which we equipped, and for the information of the Association I will present a memorandum which I have concerning our trolley mail cars.

MEMORANDA CONCERNING TROLLEY MAIL CARS.

Trolley mail cars inaugurated, May 1, 1895.
Night service inaugurated, June 3, 1895.

NUMBER OF TRIPS.

Year.	Week Days.	Sundays.	Holidays.	Per Year.
1895 (at first)	38	18	18	
1895 (later)	43	20	20	12,670
1896	47	20	20	14,315
1897	47	19	21	15,409
1898	47	19	21	15,517

In 1895 the yearly mileage was 130,000 miles; in 1898 it will be upwards of 170,000 miles.

There were originally twelve stations, to which have been added one at Charlestown, January 1, 1897, and one at Roxbury Crossing, February 1, 1898, on which date a pouch service was also established between Somerville and West Somerville. Connections have always been made with Boston & Albany and Providence depots, and Union station. Sixteen

men are constantly employed; eight conductors and eight motormen.

Out of about 45,000 trips run to January 1, 1898, there were 360 failures or irregularities, or about 8-100 per cent, and that was almost wholly due to the snow, and the consequent blockading of teams in the narrowest streets.

Seven cars handle 100,000 pieces of mail daily. The system is under the supervision of the New England Superintendent of Railway Mail. In other cities the trolley and cable service is under control of the local postmaster. The General Superintendent of Railway Mail in the United States in his report for 1895 says: "In Boston, by reason of the fact that the street car lines are all under one management, we are able to move mails from one suburb to another, as, for instance, from North Cambridge and Cambridgeport to Brookline, by direct transit; the mail not being compelled to pass through the main office. There is probably no city in the country where the benefits of this service will be as great as in Boston, with its densely populated suburban districts, all of which have heretofore been more or less restricted in their mail accommodations by reason of their mail having to go through the city postoffice. By the present system, the railway postoffices centering at Boston can pouch to the street car lines all mails for suburban points reached by them; and the street car lines, in turn, can gather up all mail from suburban points, and pouch it direct to the departing trains at the various depots."

The first practical illustration of a street railway postoffice was in Boston. Other cities earlier had street railway mail cars—St. Louis and Brooklyn—where the mail was simply carried in bulk and delivered the same as if by teams, not being worked in transit; but the Boston street railway cars were the first to be patterned after steam railway cars, with racks and all appliances for working the mails in transit—transferring, so to speak, so much working space and clerks from the main postoffice to the postoffice on wheels, thereby losing absolutely no time in handling mail matter, and enabling the business man to get his mail early in the morning, rather than

late in the afternoon, with nearly a whole day saved for him. One car is equipped with an electric cancelling machine with a capacity of two thousand cancellations an hour.

Let us follow a car to North Cambridge, touching Park Square, Cambridgeport, and Cambridge postoffices en route. Take the first trip in the morning, when the postal clerk receives from the general office all the accumulations of mail which arrive during the previous evening from all parts of the country. Upon arriving at Park Square station (the train from New York with mail from the South and New York State arrives at 5:30), this mail is delivered direct to the postal car, and the contents opened by the clerk and assorted for the carriers. Upon the arrival of the car at Cambridgeport, a fifteen minutes' run, the mail for that station is about all ready for delivery to the carrier. This also applies to Cambridge and North Cambridge. This car receives inward all mails collected at the various stations and assorts it on the car for all outgoing trains, so that when it reaches stations en route, or Boston, the mail is all ready for immediate dispatch.

Each car handles nearly five and a quarter million pieces of mail, or a total of 36,561,170 for the seven cars in a single year.

Mr. President, I thought that these facts might be of interest in showing that the mail service, as carried on here, is not merely carrying it from a station to the postoffice, which method we investigated and decided could not be done to advantage, and which is being done by pneumatic tube service here, but our method is practically a traveling postoffice, and each car is practically a branch of the general postoffice in Boston, which receives mail from the trains and assorts the mail and gives it to carriers, so that without question the average suburban mail here is two or three hours earlier in its delivery than it would be without this service.

What the writer of the paper says about the question of compensation I think is very true and important. I believe that something might be done by the Association. We have never received a compensation which has more than paid our running expenses. I think that any rate that should be fixed in

an arbitrary manner, so much a car-mile for carrying the mail, is entirely unfair. It all depends, it seems to me, on the conditions; what service is rendered, what the character of the service is, whether combined with passenger service or whether it is done with independent cars, and what the local conditions of expenses are. For example, I know that there are some street railway lines whose gross receipts from passenger business are not equal to our operating expenses for conductors and motormen in Boston. I have no hesitation in saying that the average expenses here per car-mile for conductor and motorman run to about 7.5 cents. The hours for labor are ten hours in twelve, fixed by law, and the compensation is two dollars and twenty-five cents per day, and thirty cents an hour for trippers.

In some other cities the conditions are quite different; possibly some pay as high wages. On the other hand, some mail routes are one straight away suburban route where a rate of ten cents a mile would be a good rate compared with one at thirty cents a mile where the conditions are like those in Boston.

I feel, Mr. President, that what our Congressmen need is enlightenment; that they do not comprehend the fact that the street railway service is better than the steam railway service and is of a different character, and something which is such a public benefit that it would be a pity to have it stopped, and yet which is something we cannot afford to keep on unless we are properly remunerated. I am not without hope that something may be done through our Association by getting at the conditions of service through the secretary, in correspondence with different cities. That might be done in an official way to find out what the various conditions are under which different roads, which are members of our Association, are carrying mail, and what, if anything, they are willing to do in the shape of concerted effort to bring these facts before the members of Congress who have to do with these matters. Our postoffice department is like all governmental departments, it only sees so many general things and not all the details that go to make up expenses and perfect

service, but I believe it means to be fair, and if the true facts are put before it we shall probably be able to get a reasonable compensation for this service. I am obliged for the opportunity of saying a few words, and hope that some action may be taken by the Association that will benefit us.

REMARKS OF MR. JOHN I. BEGGS ON THE CARRYING OF UNITED STATES MAIL ON STREET RAILWAYS.

Mr. Beggs, Milwaukee—I have listened to the paper which has been read with a great deal of interest, more particularly in view of the fact that the Milwaukee Company at the present time is going through the preliminary stages of establishing a mail service upon our lines which up to this time has not been instituted, even to the extent of carrying a pouch.

I may say for myself that I have not been enthusiastic over it, because of the fact that it did not seem to promise a profit, and I think, as has been truly said in the paper, that the amount of protection that the various roads expected when they were established as mail routes, has not been of the advantage to them that they hoped, and it was because of the advantage that many of these roads expected to derive by carrying the mail, that they fixed an entirely inadequate rate of compensation to be paid by the Government. The Government took the rate of compensation established on the first few roads upon which mail was carried, and attempted to fix that as the basis of compensation to all roads whose services they require. I had presented to me by the post-office officials at Milwaukee, the report of the second assistant Postmaster General, in which I found that there had been paid, not sixteen cents per mile, but in many cities, as shown by the report for the year 1896, about eleven cents per mile for postal car service, or an amount considerably below that which it costs to operate a car over the line, and yet that car is supposed to be given the right of way at all times in order to make the service satisfactory. In making inquiries about this matter I found that the wagon service was costing nearly

double what they expected to obtain a very much superior service for; and it seems to me that it is high time that this Association in its capacity as such, should appoint a committee to take this matter up with the Government and establish some fair basis of remuneration, based, as Mr. Sergeant has suggested, upon the varying conditions. There are kinds of service that could be given in one city that might not be possible in another. In Milwaukee we could displace the wagon service because we control the entire street railway system, and on account of the advantageous location of the various lines, reaching all the suburbs and running directly through the city, east and west and north and south. They propose there to do away with much of the carrier collecting service by having districts in certain sections of the city, and the carriers serving as collectors of mails, collecting the mail in certain districts and bringing it to one central point where the mail car passed, and which would pick it up periodically throughout the day, thereby reducing the number of collectors required and greatly improving the service.

As to the question of carrying mail pouches on the regular cars of the system, I seriously question its advisability—at least on our lines. It may possibly be necessary in some of the smaller cities. I am free to say for the Milwaukee company that I do not favor carrying mail pouches on platforms of our cars. The platforms are too valuable to use to carry a mail pouch at three cents a mile, and it would very greatly inconvenience the patrons of the line, many of whom insist on using the platforms, whether you like it or not. It seems to me that if this Association should appoint a committee to take this matter up in behalf of the street railways of the country, that committee could confer with Government officials and establish some fair basis of remuneration, not simply for the purpose of having street railways established as mail routes, but, as in the case of steam railroads, to make them a source of revenue and profit. I think now is the proper time to do it, because the street railway mail service is established in a comparatively small number of cities. I think the suggestion made by Mr. Sergeant that a committee of this As-

sociation should be appointed to take this up with the Government for the purpose of establishing a fair rate of compensation, is an excellent idea, and it would be one of the most practical things this Association has done for its members.

REMARKS OF MR. JOHN FARSON ON THE CARRYING OF UNITED STATES MAIL ON STREET RAILWAYS.

Mr. Farson, Chicago—I have been impressed with this thoughtful and practical paper of our friend from Omaha. It is a question which will grow upon us from month to month, because, as has been stated, this railway mail service is just in its infancy. When the street railway mail service is once started there is no danger of going back to the old system, because the people will insist upon the very best service obtainable. It is especially desirable for the larger cities, because it gives a man an opportunity to mail a letter in the morning and hear from it during the day, so that immediate action can be taken. It is an important matter to the street railway interests, for the reason that they should be reasonably and amply compensated for all the service rendered. The suggestion of the appointment of a committee is especially in point. Such a committee can be appointed to act under the direction of the Executive Committee, with authority to collate from the different members of the Association such facts as may be necessary for them to have. By acting unitedly we can secure much more forceful and intelligent action. I would, therefore, Mr. President, move that a committee of five be appointed by the Chair, to act under the direction of the Executive Committee, communicating with the different members of the Association for the purpose of getting all the facts before them and keep the members of the Association advised of their proceedings, and that this committee have authority to confer with the Committee on Post Offices and Roads and on Appropriations of the House of Representatives.

Mr. Beggs—I second the motion.

Mr. Robert McCulloch, St. Louis—I would state for the information of the Association that one of the roads in St. Louis made a contract with the Government to carry the mail and had two cars built especially for the purpose. The compensation was entirely inadequate for the service alone, not counting the investment in special cars. The company expected to derive a benefit by being able to designate its road as a United States mail road, and had the inscription made on its cars "U. S. Mail." As soon as the cars appeared on the streets, at the suggestion or interference of somebody, no one knows whom, the Government required the sign to be taken off all the cars.

Mr. Dimmock, Council Bluffs—After making an investigation and holding a conference with a number of Government officials, I think the secret of our success will lie in acting together as a body, and in the fact that we are not post roads. They make contracts with us now on the same basis as any contract drawn between individuals, which we are at liberty to refuse or accept, and if the committee will keep this point in mind, it is in our power to dictate to them the terms instead of allowing them to dictate to us. If we allow the present rates to continue there will come a time when they will pass laws declaring us post roads, which will compel us to carry the United States mails and abide by the rates named by the Government and place us in the same position the steam roads occupy to-day. Therefore, the most vital point in the whole subject is to establish rates satisfactory to ourselves while we can deal with the Government the same as an individual and before they take such action as I have mentioned.

REMARKS OF MR. HENRY C. PAYNE ON THE CARRYING OF UNITED STATES MAIL BY STREET RAILWAY COMPANIES.

Mr. Payne, Milwaukee—Recently I had an interview with some of the department officials, the Postmaster General and Assistant Postmaster General, in regard to this subject. I found these gentlemen much interested in this question, but

the difficulty with them is the lack of funds. The trouble lies back of the department. It lies in the appropriation available for this purpose, and you will have no difficulty, I think, in getting a reasonable compensation from the departments if a sufficient appropriation is made by Congress. I think the trouble lies largely there, and I have no doubt that if the committee from this Association will take the matter up and present it properly to the Committee on Appropriations having in charge the postoffice appropriation, that you will secure a very large increase. I have found the department officials willing to investigate the situation in the various cities, and to act as far as the means at their command will allow, and I have no doubt that the method proposed will be the proper one to pursue. But, of course, it will require the committee selected, if they hope for success, to visit Washington and press the claims of the street railroads on the proper committees of Congress. I am thoroughly in accord with the resolution, but the committee will find that they have more to do than gather statistics and information.

Mr. Farson's motion was then put to vote, and carried; and the President announced that he would appoint the committee later.

The President—If there is no further discussion on this subject, we will proceed to the next paper on "Maintenance and Equipment of Electric Cars for Street Railways," by Mr. M. S. Hopkins, Eelectrician, Columbus Street Railway Company, Columbus, O. I understand that Mr. Hopkins had planned to attend the meeting, but at the last moment was unavoidably detained. The Secretary will, therefore, read the paper.

REPORT OF THE COMMITTEE ON "MAINTENANCE AND EQUIPMENT OF ELECTRIC CARS FOR STREET RAILWAYS."

The Secretary read the report as follows:

The American Street Railway Association—

Gentlemen: An ancient king of fable offered a rich reward to the courtier that could tell a story that would last forever. To him

that undertook it and failed the price was his head. Were this merry monarch living to-day he might gratify his wish by asking, "How shall I best manage my street railway?" and all his newspaper editors, councilmen and other subjects would at once undertake the task, for it is a matter of common knowledge that everybody can manage a street railway much better than it has ever been managed.

The modern king of finance is daily asking this question of his hired subjects, and unless the answer is expressed in dividends the story is at an end and the head of the manager is the penalty of failure. To attempt to discuss all of the various elements entering into the composition of a successful street railway would be a continued story, and not within the province of this paper. What is the best electric equipment to purchase and how can it be made to render the best service at the least cost, is the question which daily confronts the street railway manager, and one on which he is constantly seeking advice. There can be no answer which is applicable to all street railways, and no especial merit is claimed for the views set forth other than that they are the result of experience and born of repeated failures and successes.

CAR EQUIPMENT.

No fixed rule can be laid down for the selection of equipment, as climatic conditions, character of traffic, frequency of headway, conditions of roadway, municipal regulations and grades are all elements which determine what the equipment may or should be.

CAR BODIES.

For years car builders have attempted to devise a car body which would be equally durable in both summer and winter, but judging from the character of equipment now in use on the majority of roads, such a car has not yet been produced. The combination car with movable parts is not satisfactory for winter use, is troublesome, noisy and cold, and is lacking in many of the essential features of the open car for summer service. The open cross-seat car of the barge type, with running boards on the side, seems by far the most desirable type of car for summer service, affording the largest seating capacity and the best facilities for receiving and discharging passengers, which is a great advantage in city service. Considering all features, the box car with side seats, large windows, wide end door to the side of center, roomy platform and vestibules closed on one side, seems best adapted to the average condition of winter service. While the vestibule type, closed on one side, is not so convenient for the handling of large crowds, yet the additional safety afforded on double-track roads should receive full consideration even at the expense of con-

venience. In localities where winters are accompanied with snow fall and freezing weather, the vestibule affords protection to passengers, and motormen and conductors are able to render very much more efficient service.

The long car body seems to be growing in favor with the railway manager, due to the comparatively small increase in operation, in comparison to increased carrying capacity, and its allowing of the increase of headway or decrease in number of cars run, resulting in a large decrease in operating expense per passenger carried.

The purchaser of car bodies should have a clear conception of the details of car construction, and specifications should clearly set forth the essential feature—minor details of interior finish and decoration being left to the manufacturer.

In the construction of box-car bodies, the trusses should be as deep as possible and great care taken to secure a perfectly rigid fastening at end of sill, as the slightest deflection throws an undue strain on joints and framing of car body.

Where side sills are plated on outside with steel plates, all season cracks should be thoroughly filled with a thick mixture of lead and oil, and entire surface given a heavy coat of oil paint before plate is put on. It is hardly necessary to say that all joints should be well leaded and protected from moisture. A heavy steel roof rafter in one piece should be put in at every post, and a saving in maintenance will be made by having platform floors of oak or maple. The trolley stand should be mounted on a trussed support, which will distribute the strain to the ends of car as much as possible.

Ash seems to be almost universally used in post and light framing of cars. This is probably due to the difficulty in securing the grade of oak necessary, the lighter the weight of the ash the greater ease with which it is worked. In spite of these difficulties, oak is far preferable, being stronger and more elastic, and will give a far longer life.

TRUCKS.

Under the average conditions a twenty-two foot closed car or eight reversible seat open-car body should be the limit for a single truck. Although there are single trucks which will carry a longer body fairly well, yet the increase in maintenance will in most cases warrant the use of double trucks. The local conditions should govern the type of double truck used, the bolster type in most cases being preferable for long cars on high speed, suburban service, while for city service, where heavy grades and quick starts demand maximum traction, and short curves make it necessary for the wheel to turn under the sill, the bicycle type must necessarily be used. This type of truck is no longer an experiment, and, while they possibly require

more careful inspection and adjustment, very efficient service can be secured from trucks of this type.

Trucks should be made up of a small number of parts, cast and malleable pieces should be the lightest consistent with strength. The springs should be so arranged as to prevent oscillation and give an easy riding car under all conditions from no load to full load, and when the style of truck is of such design as to prevent the use of an under truss, the spring base must be exceptionally long and the end springs so arranged as to relieve the strain on the car sills.

The brake mechanism should be so designed that the strains will be equally distributed on all parts throughout its range of movement. The pins should be of ample size to provide for wear. The slider method of support for brake beam will be found more satisfactory than the loop support. The minimum amount of friction should exist between brake staff and shoe, and release springs as light as possible.

ELECTRICAL EQUIPMENT.

In the selection of the electrical equipment the main point is to secure equipment of ample capacity and proper design for the service required. In a railway motor, the mechanical and electrical features which influence its maintenance should receive very careful consideration. The bearings should be large and lubricated by oil from below and cup grease from above, and so designed that the drip from the bearings will fall outside of frame. The armature should be so constructed as to permit the shaft being pushed out without disturbing the commutator and winding.

I am glad to note that the importance of light weight and slow peripheral speed of armature has been recognized in the recent design of railway motors. The inertia or flywheel capacity of the armature should be the smallest possible consistent with the work required. Engineers differ as to the best method of suspension. From a theoretical standpoint, the cradle or side bar suspension has the lead. The dead weight is largely removed from axle, thereby eliminating to some extent the hammer blow on rail-joints, decreasing the wear on axle brasses and securing the better alignment of gears; yet, in practice, the nose suspension is still preferred by the writer, as the car starts more smoothly—the weight of motor on spring supports overcoming the jerk and quiver so common in other methods of support. The specifications for railway motors, as drawn up by leading manufacturers of to-day, amount to practically nothing, and would suggest that the purchaser of motors in his specifications clearly define the rating, heat limit and efficiency.

The series parallel controller is in most respects a satisfactory device, the chief objection being the narrow range of speed on running notches. Specifications for resistance should provide that the

last two points of resistance be of sufficient capacity to allow of their continued use as running notches, especially where cars are operated in city service.

There are several types of magazine fuse-boxes or cutouts and single cutouts using a special fuse, which possess a number of points of merit. Without going into detail, it is the opinion of the writer that under average conditions the standard magnetic blowout fuse-box, using a link fuse, is preferable.

Each car should be equipped with a thoroughly reliable lightning arrester. The points to be noted in selecting this device are as follows: The kicking-coil should always be installed; the air gap should be as small as possible; there should be a positive and quick device for interrupting the current after discharge, and one which will not be injured by discharge; there should be a non-inductive resistance in the main circuit which will limit the flow of current and thereby prevent the opening of the circuit breaker at the station when several arresters operate at the same time.

One of the most puzzling problems brought before the manager to-day is the amount which should be expended in the maintenance of old equipment before it should be replaced by new. To the average master mechanic this would seem a simple problem of making a careful estimate of the difference in cost of maintenance of the old and new equipment, due consideration being given to the interest on money invested in new equipment and its increased efficiency. Still, after the master mechanic has conclusively shown that by putting in new equipment a marked saving can be made in cost of operation, the manager has to consider the financial condition of the property, the advisability of increasing the investment, the possibility of doing so, and whether there are not other departments of the road where a greater saving can be made by increasing the investment. One should go slow in putting in new equipment, as new apparatus may at first seem to be void of the main defects inherent in old equipment, yet when put in operation other defects occur which under the varying conditions may prove even more disastrous than the old.

MAINTENANCE OF EQUIPMENT.

The cost of maintaining equipment depends on various complex conditions, some of which are beyond control of the manager, and others for which he should be directly responsible. Heavy grades, numerous railway crossings, sharp curves, dirty and unpaved streets, imperfect and poorly constructed equipment, long and severe winters, all affect cost of maintenance unfavorably and are beyond the control of the manager. But the character of men who operate the cars, the manner of operation, the way in which repairs are made, the character of men engaged in repairs, and the material used, are the controllable

elements, and in most instances the chief features affecting maintenance.

CARE OF EQUIPMENT IN CAR HOUSES.

Generally one of the following three methods are used for daily inspection of car equipment, namely: inspection of cars for each trip, inspection of equipment at night by motor inspectors, inspection of equipment during the day by motor inspectors and repair men.

In regard to the first case, that of the trip inspection, I would say that in the present degree of perfection attained by manufacturers of railway equipment, trip inspection should not be necessary, and, excepting on interurban lines operating at high speed over long runs, is of doubtful value. It is expensive, requiring the services of an inspector who is necessarily a man of some ability for each line of cars. The period of time for making this inspection is necessarily very short, and the entire time is taken up in mere inspection—little or no opportunity being afforded in which to make repairs.

In regard to night inspection, the experience of the writer has been such as to absolutely condemn such a method as expensive, slovenly and unsatisfactory. It is impossible to make a thorough inspection of cars at night, no matter how well lighted the car house may be, and the efficiency of the work done by the men is very far below that of the work during the day. Therefore, when local conditions will admit, inspection of cars during the day seems by far the most advantageous.

We will assume a car-house station, from which twenty-five or more cars are operated. There is usually one general foreman in charge of this station. His duties are chiefly those of the transportation department, but he should be a man thoroughly conversant with the usual trouble which may occur in the operation of the equipment, and know how to direct minor repairs. It would be better, of course, if he were able to personally superintend the actual work of repairs, but it is usually very difficult to find men who are good mechanics and likewise efficient in the transportation department.

For making inspection and running repairs such as should be made in car-houses, it is a safe rule to have one man to seven cars. It is important, however, to have in all car stations a man known as chief inspector of that division, who is thoroughly conversant with practical electrical and mechanical matters. This chief inspector should have under his care for inspection and repairs seven cars, and also have direction and supervision of the other two repair men who care for the remaining eighteen cars.

It is important that the responsibility for the proper repair of cars be definitely located, as nothing is so demoralizing to the force of motor inspectors as to have a case of trouble arise and not be able to trace the responsibility at once to the proper source.

The duties of these men should be to make a daily inspection of every car assigned to them, starting first with their motors, examining the grease cups, the brushes, cleaning the motors, examining connections, etc. They should remove the covers from their controllers about once in three days and oil the cams very lightly with vaseline or grease, remove any blisters which may have appeared on the contact points and carefully examine the adjustment of contact fingers. Too much emphasis cannot be given to the inspection of all brake rigging, and very thorough inspection should be made daily from the brake-handle to the brake-shoe, and the brakes tried by inspectors before the car is placed in service. A broken brake-chain or worn-out shoe, a broken brake-clutch or a broken brake-pin are things that should never occur through neglect, and if an accident of this kind does occur, the cause should be immediately traced and the responsibility located. Economy in maintenance should never be exercised at the expense of absolute safety, and brake-chains, pins and shoes should be discarded long before the danger point is reached.

The general public forms its opinion of maintenance of equipment by the little things on the interior of the car, such as a screw loose in the back, a broken strip on the floor, loose register pulley, broken hand-strap, broken glass, rattling glass, and hundreds of other little things which make the fittings of a car body. Repair men and inspectors should be so trained that in passing through the car on their inspection they should note any little thing of this kind at once, and the rule should be that they stop and repair it at once, for if allowed to wait till some other time the repair is usually neglected entirely.

The actual repair work done by these inspectors should be all work possible to be done without the use of machine tools, or which, if done by them, will not require the loss of the car from service for a period of more than two hours.

If during this inspection the motor inspector discovers trouble which is beyond his ability to repair, he should fill out a repair slip and send the case with the slip at once to the repair shop, stating the nature of the required repair, assuming that the repair shop is run as a separate department from that of the car barn. If the nature of the trouble is such as not to immediately incapacitate the car for use, but which requires the services of the repair shop department, he should fill out the blank as above noted, and send same to the foreman of repair shop, but this notice to the repair shop foreman should in no way release the motor inspector from the responsibility of the successful operation of the car. If the repair shop foreman is unable to take the car off the road at once, owing to press of work, it is the duty of the motor inspector to watch continuously the development of this trouble, and if at any time he thinks it has so advanced that the car is not safe for successful operation he should leave the

car out of service, and so notify repair shop foreman. If the latter is still unable to receive the car at the shop he should then make a personal examination of the car and assume responsibility for its further operation.

The question as to how often car equipment should be taken to the shops for a general inspection and overhauling, and what tests the electric equipment should be given at the time of inspection are subjects upon which electrical engineers widely differ. Considering the average conditions, and assuming that the equipment is in good condition, it is the opinion of the writer that the taking of cars to shops once every six months should maintain the equipment in good condition and assure its efficient operation.

MOTOR BEARINGS.

Bearings should be run "close" at all times, and the time of their renewal should be determined by the effect of the wear on the gear and pinion, as the wear on these parts is largely affected by the wear of the bearings.

After a series of tests covering quite a period of time, as to the wear of various materials used in motor bearings, the writer feels warranted in making the statement that under the ordinary conditions the best grade of babbitt or brass bearings should give a longer life than six months, and when a bronze bearing of the proper mixture is used and properly lubricated a life of twelve months can safely be expected. The method of lubrication largely affects the life of brasses. After long tests with various lubricants the writer has discontinued entirely the use of grease on armature brasses, and in most cases on axle brasses, a good grade of engine oil, supplied through wicks, being more satisfactory and economical.

In order to reduce the maintenance of brasses to a minimum the use of phosphor-bronze is strongly recommended. Street railways operating twenty-five or more cars will find it economical to cast and machine their own brasses. This may be discouraging to the supply men, but it means money on the right side of the ledger when the expenses are footed up. A small brass furnace can be erected cheaply, and after suitable jigs, which can be attached to any lathe, have been provided for boring and turning, the cost of casting and boring is very little more than the cost of rebabbitting, especially where babbitted brasses are machined after boring, while the life of the bronze bearing is far in excess of that of any babbitt yet tried.

Rough and burnt commutators are too frequently the cause of expensive motor repairs, and usually indicate imperfect motor design or inexcusable neglect. Well-designed motors in good condition, even under the hardest service, should not require turning oftener than once in eight months, provided, of course, the average work is

within the rated capacity of the motor. There is nothing that so well indicates to the practical man the conditions of the motor as the condition of the commutator. Whenever the commutator shows signs of burning or blackening, steps should be taken at once to prevent it. It is not advisable to try to prevent this by the continual sanding of commutator by motor inspectors, though the occasional cleaning up of the commutator with sand paper is necessary with all motors. The causes of trouble of this character are so numerous that mention is made of only a few of the more important.

The kind of brush used is an important factor. Brushes should be of soft, close-grained carbon treated with a good lubricating compound—one which does not flow too freely from the heat from the motor, and which will not burn and carbonize on commutator. The price of the brush is not a material consideration, as a brush which is slightly superior to another will prove economical even at quite a large increase in first cost. As a rule the tension on the brushes of railway motors is too light. It is a common belief that heavy tension causes wear of the commutator, but experience has shown that the actual wear of commutators, due to the friction of the brush, is very small, and that in some cases increased tension will materially decrease the sparking, which causes the greatest wear. Improper alignment of brush-holders also frequently causes sparking. In recent practice the use of side contact springs on brushes has been generally abandoned. On motors carrying heavy currents this spring is quite essential, as the excessive heating of the brushes is caused by limited contact in the holder.

Commutator insulation should be made of what is known as the built-up mica segments of the very softest grade of amber mica. A hard, clear mica should never be used in the commutator, as this mica will not wear away as fast as the copper, and there is nothing so disastrous to the life of the commutator as high mica insulation.

In some motors it may be necessary to change the winding of the armature and field coils in order to avoid the burning of the commutator. First, determine by actual experiment what change in winding is necessary, and then equip with the new, winding every armature or field that comes in burned out. The change can thus be made without any great expense, as the greatest part will be borne by the maintenance charge.

THE ELECTRICAL TESTING OF RAILWAY EQUIPMENT.

Elaborate systems for the periodical testing of insulation on railway equipment seem to be growing in favor with some electrical engineers, but the practical value of these elaborate tests is not fully demonstrated. Experience has shown that tests of this kind are very misleading and frequently cause the tearing down of equip-

ment, which under ordinary conditions, and had no tests been made, would have continued in service for a long time.

Judging from my own experience, it is neither necessary nor advisable to test periodically the insulation on the equipment, but to make such tests only in cases where the motors are not working properly. The proper training of motor inspectors as to the little points about railway equipment which clearly indicate trouble with motor, will locate in nearly all cases trouble due to weak insulation, so that it can be remedied before any serious damage has resulted to any other part of the equipment.

All armatures and field coils repaired should be carefully tested as to resistance and insulation to ground, and on all armatures having coils repaired, new commutator put on or commutator turned. the resistance between commutator bars should be very carefully measured. This should be done preferably with a portable whetstone bridge testing-set, capable of showing clearly a variation in resistance of 0.001 ohm. This is one of the most important tests to be made in the care of railway equipment, as more burnouts of armatures are caused by the slight, short circuiting of coils, due to the bridging over of insulation between bars by solder, acid or copper turnings under the leads, than from any other cause. These defects can be located only by a test of this kind. A bad joint or any mistake in connecting up the leads will be detected at once before any damage has been done. For testing insulation to ground I consider a first-class magneto of 10,000 ohms resistance all that is necessary.

TRUCKS.

As the design of trucks varies so widely, very little can be said in a paper of this kind as to the detail of truck maintenance other than to say that all joints should be kept perfectly tight, and where they do become loose the parts should be swedged out and refitted. All bolts should fit tight, and the nuts should be secured by lock washers. In the opinion of the writer soft, gray iron, inset with plugs of soft steel, has never been equaled for shoe brakes. The material giving the greatest amount of friction against a chilled surface should always be used, regardless of cost.

Much has been written of late on the subject of car wheels, their wear and alignment, and still street railway managers are careless about their wheels. Too much care cannot be given to the sizing and alignment of wheels and the pressure with which they are forced on the axle. At least fifty per cent of the wheel removals throughout the country are caused by broken or sharp flanges or a broken wheel. The use of sand influences largely the life of wheels, but the conditions vary so widely that I would not be justified in saying that in no instance should a sand box be placed upon a car. I will say,

however, that where it is possible to successfully operate without them sand boxes should be discarded and other means used for sanding the track. In most cases it is far more economical to fit up a special car capable of carrying a large amount of sand, and sand the track for, say, one hundred feet before each point where a stop is likely to be made and on grades and in places where the track is exceptionally slippery, than to sand the rail for its entire length.

REPAINTING OF CARS.

The experience of the writer has clearly demonstrated that it is satisfactory to repaint cars without removing all of the old paint. Patent varnish removers, scalers, etc., are a snare and a delusion. The writer has found the following system of repainting cars to be quite satisfactory: First remove all old paint by softening it with a blow-pot just enough to allow it to be scraped off with a broad putty knife, not allowing flame from the blow-torch to strike the bare wood at any time. Then sand off the surface well with block and sand paper. Where any new work has been put in it should be first primed with a coat of boiled oil and a little lead and allowed to stand for not less than four days. Dashes and all iron-work should be thoroughly cleaned with strong alkali and primed with a coat of linseed oil put on boiling hot and allowed to thoroughly harden, giving one coat of oil and lead before color. If the surface is rough, plaster with lead on this coat. Then allow it to thoroughly harden, and sand with block; then lay on two coats of flat lead, two coats of color, color varnish, stripe and ornament, finish with one coat of rubbing varnish, and one coat of finishing varnish. The main object in the painting of cars should be to secure a hard, smooth surface which will hold out the varnish with the very smallest amount of material; the thinner this surface is the better. Care should always be taken where plaster is used to make it as thin as possible, and lead coats, color and varnish should all be carefully tempered, so as to set alike, as most cases of cracking of paint are due to the want of proper tempering of lead and color coats.

A car painted in this manner should not require repainting for from six to seven years if properly cleaned and varnished. Cars should come into the paint shop, even where the best grades of varnish are used, once every eight or ten months and be washed thoroughly with pumice and strong soap and given a coat of finishing varnish. The life of varnish depends largely on the care given to the cars in the cleaning department. Cars should be sponged off daily with clear water, and any accumulation of dirt removed as far as possible by the use of a chamois skin and sponge—care being taken to rinse off the grit before rubbing with sponge or chamois. Once every thirty days the car should be thoroughly washed down,

using a good grade of soap. If it is impossible to remove dirt and stains from the surface of the cars with the finer grades of soap, strong soap may be used, it being found that the injury to varnish resulting from the use of this soap once every thirty days will be more than offset by the saving in cleaning and touching up when the cars are taken into the paint shop for revarnishing.

In the selection of designs for painting of cars the plainest and neatest design should be selected as a rule. No lettering should be done on the panels, as this increases greatly the cost of maintenance in the paint shop department. In all cases the signs should be put upon sign boards made especially for the purpose.

The inside of the cars should be cleaned thoroughly and rubbed down with pumice stone every second time the car comes into the paint shop to be revarnished. There are a number of so-called car cleaners on the market which are rather a detriment than an advantage to the outside surface of the cars, but which may be used to advantage on the interior of the cars, especially around the sash. Special observation of the interior of the cars will show that the varnish commences to disappear first around the sash—moisture from the windows gathering around the moulding which holds the window sash, first discoloring it and gradually working into the sash itself. A car cleaner which is made up largely of oil and dryer, if used about once a week on the window sash and moulding, will be found to be a great advantage. Three years ago four new cars were selected, and a car cleaner used weekly on the windows of these cars, and to-day not a stain is to be seen on sash or moulding, the cars having been revarnished twice during that time.

After a number of trials of various floor paints and paints mixed especially for the purpose the conclusion has been reached that there is nothing equal to pure white lead and linseed oil and suitable color for the floors of all cars. The majority of car floors are stripped, and it has been found impossible to find any material hard enough to stand on the top of the strips of a car floor, while almost any material will stand the wear, but not the moisture, between the slats. It is very evident, therefore, that the best paint for this purpose is one which will best preserve the wood in the floor of the car from the constant moisture to which it is subjected.

As to the car roofs, the main object is to put as little material as possible on the canvas of car roofs, and that material should be elastic, and yet withstand the action of the weather. Great care should be used in tempering of paints for roofs. Avoid painting the roof one time with one kind of paint and the next time with another, for in the long run this will invariably crack and require the renewal of the canvas on the roof. In a number of cases it is customary to use slush or any old thing which happens to be in the paint shop for painting roofs of cars. This is a great mistake, for no paint is too

good for the car roof—the best white lead and oil giving the best results.

Unquestionably the truck of a car should be painted with a good grade of lead paint, as it prevents rust, decreases renewal of bolts and adds greatly to the general appearance of the car. A handsomely painted car body mounted on a dingy, rusty-looking truck has a half-finished appearance, to say the least.

Respectfully submitted,

M. S. HOPKINS.

DISCUSSION ON REPORT OF COMMITTEE ON "MAINTENANCE AND EQUIPMENT OF ELECTRIC CARS FOR STREET RAILWAYS."

The President—Gentlemen, this report is now before you for discussion. There are certainly many valuable points embraced in the paper, and we would like to have them considered fully.

REMARKS OF MR. H. M. SLOAN ON THE MAINTENANCE AND EQUIPMENT OF ELECTRIC CARS FOR STREET RAILWAYS.

Mr. Sloan, Chicago—The main points in the paper just read have been very thoroughly covered, I think, but there are some of the details with which I do not entirely agree. For instance, the gentleman states that he utterly condemns night inspection. With us night inspection works quite satisfactorily for several reasons; the main one being that we change our brushes every night. Every motor brush is changed each night. It works well on the commutators and results in very little wearing down of the commutators. I have had commutators in for a year with not $\frac{1}{8}$ in. wear, and I believe it is entirely due to the fact that we change the brushes every night. I think a car cannot be overhauled too often. With us it goes on constantly. When a motor comes in with the armature burnt out or for any other cause the truck is run from under the car, and another truck already prepared is run in to take its place. In that way we inspect our trucks frequently, and find it works satisfactorily.

REMARKS OF MR. THOMAS HAWKEN ON THE MAINTENANCE AND EQUIPMENT OF ELECTRIC CARS FOR STREET RAILWAYS.

Mr. Hawken, Rockland, Me.—I am sorry the writer of the paper is not here, as I wish to ask him a question on an important point in regard to the series control of running motors. The electric people have always advised a certain point on the control for hill climbing and for efficiency of running the motors, this point being the fifth point on the control which connects the motors in series and the fields in shunt on the K-2 control. The one question that I wished to ask Mr. Hopkins was—if he would advise the running on grades on this point. I notice that the rear motor, when the motors are in series, does about all the work, especially when the track is a little slippery. I know of one road in particular that uses that point very frequently and it has a great deal of trouble from the burning out of armatures. I should like to know from some of the gentlemen who have had experience what point they really think is most efficient in running motors with the series controller. I have made it a practice in climbing hills to use the next to the last notch on the K2 and the last on the K10 controller. On these points the motors are connected in series parallel and they take the load equally. I find that these are the most efficient points and the armatures have a long life. I have had motors in constant use for more than three years, with a mileage of from one hundred and thirty to one hundred and forty-four miles per day, and have not lost an armature by burnouts.

Mr. McCormack, Borough of Brooklyn—Mr. President, if there are no further remarks to be made on this subject, I move that a vote of thanks be returned to Mr. Hopkins for this paper. I learned from Mr. Kelly that Mr. Hopkins had intended to be present and read the paper, but he was unavoidably detained at home; and I think our congratulations should be sent to him. Carried.

The President—Mr. W. Caryl Ely, our first vice-president, and also first vice-president of the Street Railway Association

of the State of New York, has an invitation to extend to the Association; and he will now be given an opportunity to present it.

INVITATION TO ATTEND THE SIXTEENTH ANNUAL MEETING OF THE STREET-RAILWAY ASSOCIATION OF THE STATE OF NEW YORK.

Mr. Ely, Niagara Falls—Gentlemen, the sixteenth annual convention of the New York State Street Railway Association will be held at the Manhattan Beach Hotel next Tuesday and Wednesday, and in behalf of that Association, and upon the suggestion of Mr. G. Tracy Rogers, its president, I take pleasure in presenting the invitation of that Association to such of you as may be able to do so, to meet with us next week, and in that cool place, amid the surging of the murmuring waves, we may be able to get cooled off after the fatigues of this occasion.

Mr. Goff, Fall River—I move, Mr. President, that the thanks of the Association be extended to the New York Association, through Mr. Ely, for their very kind invitation to meet with them next week.

Mr. Dimmock seconded the motion, which was carried.

The President—The motion is carried, and I trust that as many of our members as possible will attend that meeting.

We will now take up the matter of the appointment of the Committee on Nominations and the Reception of Invitations for the Place for Holding the Next Annual Meeting. The Secretary has some communications which he will read.

INVITATION TO HOLD THE NEXT MEETING IN DETROIT.

The Secretary read the following communication:

DETROIT CITIZENS' STREET RAILWAY COMPANY.

Detroit, Mich., August 26, 1898.

T. C. Penington, Esq., Secretary, American Street Railway Association, 2020 State Street, Chicago, Illinois—

Dear Sir: I beg on behalf of the Detroit Citizens' Street Railway Company, The Detroit Electric Railway Company, and the Detroit,

Fort Wayne and Belle Isle Railway Company to extend to the American Street Railway Association a very cordial invitation to hold the annual Convention of 1899 in this city. Our General Manager, Mr. A. B. du Pont, hopes to be in Boston next month to personally press this invitation upon the Association.

So much has been said throughout the country relative to the street railways of Detroit that I am quite sure, outside of the attractiveness of Detroit as a convention city, the members of the Association would enjoy coming here to find out about these things for themselves.

Yours truly,

J. C. HUTCHINS,

Vice-President.

The Secretary also read communications requesting the selection of Detroit from Hon. H. S. Pingree, Governor of Michigan; Hon. William C. Maybury, Mayor of Detroit; Mr. J. C. Ferry, Secretary of the Chamber of Commerce of Detroit; Mr. Frank W. Waring, Secretary of the Board of Trade of Detroit; Mr. Walter S. Campbell, Secretary of the Detroit Manufacturers' Club; Mr. Walter S. Campbell, Actuary of the Merchants' and Manufacturers' Exchange of Detroit; Mr. O. A. Bierce, of the Detroit Convention and Business Men's League, the Detroit Free Press, the Detroit Journal, the Detroit Tribune and the Detroit Evening News.

The President—These communications will be referred to the Committee on Nominations to be hereafter appointed. Are there any other invitations to be extended to the Association from any other city?

INVITATION TO HOLD THE NEXT MEETING IN KANSAS CITY.

Mr. Holmes, Kansas City—I should like to introduce Col. Morse, who will extend an invitation to this Convention to hold its next meeting in Kansas City.

Mr. Morse, Kansas City—Mr. Holmes this morning suggested certain advantages which we have as a place for holding the next Convention; and we extend a most hearty invitation to the Association to meet there in 1899. We trust

that the invitation will be favorably considered by the Association.

The President—These invitations will be received and referred to the Committee on Nominations. The Secretary has another communication in this connection which he will read.

COMMUNICATION FROM THE MASSACHUSETTS STREET-RAILWAY ASSOCIATION.

The Secretary read the following:

Boston, Mass., September 3, 1898.

T. C. Penington, Esq., Secretary, American Street Railway Association, Hotel Brunswick, Boston—

My Dear Sir: I have been requested by Mr. E. C. Foster to call your attention to the following vote which was passed by the General Committee of the Massachusetts Street Railway Association at a meeting held Friday, August 26, 1898:

VOTED: "That Mr. C. S. Sergeant is the unanimous choice of the General Committee as candidate for President of the American Street Railway Association at its annual election in September."

Respectfully yours,

PHILIP L. SALTONSTALL,
Secretary General Committee.

APPOINTMENT OF THE COMMITTEE TO NOMINATE OFFICERS AND SELECT THE PLACE FOR HOLDING THE NEXT MEETING.

The President—In accordance with the custom of the Association, the President is called upon to appoint a Committee to Nominate Officers and Select the Place for Holding the Next Meeting. I will appoint upon that Committee the following gentlemen:

Mr. W. Worth Bean, of Michigan, Chairman.
Mr. D. G. Hamilton, of Missouri.
Mr. E. C. Foster, of Massachusetts.
Mr. W. F. Kelly, of Ohio.
Mr. J. R. Chapman, of Illinois.
Mr. Henry C. Payne, of Wisconsin.
Mr. E. H. Davis, of Pennsylvania.

I suggest that this committee get together as soon as possible to confer upon this subject, so as to be able to report to-morrow.

ANNOUNCEMENT OF ENTERTAINMENT.

The President—Gentlemen, I wish to remind you of the trip planned for this afternoon which is to be an excursion down the harbor to Nantasket Beach, where a clambake will be served. There will be special cars in front of the Hotel Brunswick at two o'clock to take you to the boat which will leave Rowes' Wharf at 2:30 o'clock, sharp. As to the time for coming back, it is said that this is a typical day for a clambake and the beach is a beautiful spot, and it is not likely that the special boat will leave the beach to return before half-past eight; but for the benefit of those who may want to get back for evening engagements, there are other ways of returning than by the boat. The Secretary suggests that the ladies be reminded of the necessity of taking some wraps along, as it is likely to be a little cool on the return trip to-night.

Mr. Payne, Milwaukee—I move that we adjourn until 9:30 to-morrow morning. Carried.

THURSDAY'S SESSION.

President Lang called the meeting to order at 10:45 o'clock a. m.

INVITATION TO THE INTERNATIONAL ASSOCIATION OF FACTORY INSPECTORS TO ATTEND THE MEETING.

The President—Mr. McCulloch has an announcement to make before we proceed with the regular business of the session.

Mr. Robert McCulloch, St. Louis—Mr. President and Gentlemen: The International Association of Factory Inspectors is now in session at the House of Representatives,

in Boston, and it has been suggested that we send them an invitation to attend our sessions and to inspect the display of machinery in this hall. I move that the following invitation be sent:

Boston, September 8, 1898.

To the International Association of Factory Inspectors, in Session at the House of Representatives—

Gentlemen: The American Street Railway Association extends to you a cordial invitation to visit them at the Paul Revere Hall and to inspect the display of machinery, all of which is found in Mechanics' Building.

Your badges will be recognized at the entrance.

Respectfully yours,

THE AMERICAN STREET RAILWAY ASSOCIATION,
By ALBION E. LANG,
President.

The motion to extend the invitation was adopted.

The President—We will now take up the first paper for this session, "To What Extent Should Street Railway Companies Engage in the Amusement Business," by Mr. Walton H. Holmes, General Manager, Metropolitan Street Railway Company, Kansas City, Mo.

REPORT OF THE COMMITTEE ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

Mr. Holmes read the report, as follows:

The American Street Railway Association—

Gentlemen: When I consented to prepare a paper for this Convention on the subject selected for me by the Executive Committee, namely, "To What Extent Should Street Railways Engage in the Amusement Business," I did so with great reluctance, knowing full well that the conditions to be met with in the numerous cities where street railways are an important public agency are so widely different as to present a different problem in almost every instance; and, except from a very broad view of the subject, render comparisons altogether impossible. But in spite of these inherent difficulties, I feel that some general principles may be extracted from street railway experience,

which may be advantageously employed in correctly solving a problem which must arise in nearly every locality where street railways exist. I have not hesitated to ask for the experience of others, and I beg to acknowledge, at the outset, the many valuable responses which I have received from street railway managers for whose judgment I entertain the highest respect.

Street railways are peculiarly an urban agency. They were born of the wants and convenience of a city population, and the development and growth of travel are so closely associated with the growth and prosperity of the municipality that street railway managers can never be too zealous and active in every public enterprise which is designed and well calculated to stimulate municipal expansion and civic pride among its citizens. This is notably an age of progress in every line and in all directions. The ideal city of a few years ago is no longer considered adequate in its appointments for the welfare of its inhabitants. Every up-to-date city in the land has come to acknowledge that it owes a larger duty to those who live within its boundaries than merely to afford police and fire protection. The comfort and pleasure of its inhabitants must now also be considered and looked after, and this tendency and demand of the age has crystallized and taken form in providing parks and squares for the comfort, pleasure and entertainment of the great body of the people, and drives and boulevards for those who are more favored in the distribution of worldly goods. These public pleasure resorts are an important factor in the question under discussion. Wherever established, they are preferred by the people, who justly regard themselves as proprietors, and hence it is that many street railway companies which undertook to supply an obvious public want in this direction a few years ago have found this particular occupation gone and only a small number of the important systems of the country any longer maintain these parks. The demand has regulated the supply.

But the street railways have a great and peculiar interest in these public parks. It is our mission, as a public agency, to render them as accessible and useful to the people as possible; and to this end it must be apparent that by a reasonable expenditure of money towards the amusement and entertainment of the people in their own resorts street railway travel can be stimulated and the health and welfare of the community greatly promoted at the same time. Results are more easily obtained by encouraging a natural tendency of the kind referred to than by efforts to entirely create business through independent and artificial means. With rare exceptions, commissioners of these public parks look upon them as the inheritance of the people and regard it as a solemn duty to encourage the efforts of the street railways to render them as accessible and pleasant for the inhabitants as possible, and are only too glad to have their own endeavors in the same direction supplemented by the street railways.

Public parks are usually numerous and scattered in different localities and in this lies a great advantage to the street railway over the maintenance of a private resort of its own. In the one case travel becomes congested, with the increased danger of accidents and maintenance of a surplus amount of idle equipment for a large portion of the year, while in the other public patronage is more generally distributed where it naturally belongs and serves to keep better employed the standard equipment of the line without much additional expense or risk.

With reference to parks and similar resorts, I think therefore it may fairly be deduced that street railways have generally found their maintenance on private account to be ill-advised and unprofitable except in a few localities where the location of the park is such as to warrant more than the ordinary five-cent fare, and that the best results are to be secured by intelligent aid of the public municipal authorities in their efforts to render their own resorts attractive, pleasant and entertaining to the great body of the people. The same thing is obviously true with reference to large buildings of a quasi-public character, intended to afford accommodations and facilities for conventions, entertainments and exhibitions on a large scale. In my judgment, such enterprises when judiciously conceived and undertaken, may well receive substantial encouragement from street railways to an extent which would warrant representation being accorded them on the board of managers. I consider such representation important in the interest of the public as well as of the street railway, because both have an apparent and common interest in keeping the price of admission to such buildings down to a figure which will make them always popular in fact as well as in name, and so a stimulant of travel on the street railroad.

Street railways have seldom undertaken to foster other than out-of-door amusements and these are always attended by the risk of bad or unseasonable weather and the like, which frequently entails heavy loss. Cars must be accumulated in large numbers where such attractions are being presented in order to take the people away at the proper time, thus greatly increasing the cost of car service and sometimes necessarily retarding the tide of regular travel at other places, with the attendant loss. Such enterprises frequently engross much valuable time of the chief managing officers which would otherwise be expended in other directions. These and kindred considerations which will readily occur to the experienced railway manager are very potent reasons why the companies should not themselves engage in the amusement business. Many of these things are impossible to estimate in dollars and cents, and so it is that street railways are every day coming to realize more and more forcibly that the business to be relied on for profits is that which follows the natural channels and can be handled in the usual and ordinary way.

I need hardly say that some of our large cities have reached a point where the ideas advanced in this paper have no practical application. With some of them, the problem is not how to create or stimulate travel, but rather how to best handle and take care of the patronage which is already at hand. Then, again, there are many small cities which have not yet attained to that important rank which justifies the public authorities in undertaking to provide for the pleasure and amusement of the people at large. Street railways thus located have frequently found it profitable in a degree to supply this want on their own account, and to them the views here presented are likewise of little practical importance. I have considered more particularly that large class of cities which occupy the middle ground between these two extremes and where it has seemed to me there is opportunity for the profitable and practical application of sound principles of street railway management in the particular under consideration.

Where amusements are to be provided or encouraged at all, general experience shows that there is little or no difference of opinion as to the character of entertainment which ought to be furnished. The view entertained is well-nigh universal that expenditures in this behalf should be moderate in amount. The best and most satisfactory results have generally been obtained from such attractions as novelties in the way of music, like noted bands or other musical combinations, vaudeville, athletic sports, base ball, where the city is large enough to have membership in an important league and to support a first-class club, foot ball, and other similar out-of-door entertainments.

In many of the Southern and Western cities where visitors are few and business comparatively dull in the summer season, with much of the resident population sojourning at the seaside or in the mountains, and half-holidays, with business houses generally closed, is a condition by no means infrequent. This condition means light travel on street railways unless some inducement outside of the ordinary is offered to those who have remained at home. Amusements and entertainments of the kind to which I have referred have been found to be well adapted to this purpose, and in many instances have proved to be undoubtedly profitable to the street railway.

It has occurred to me that perhaps I may be expected to say something of my personal experience extending over a period of many years, leaving my intelligent hearers to make such application of the same to their own conditions and environment as to them may seem advisable. During my service as a street railroad man Kansas City, where I have always operated, has grown from a city of thirty thousand to upwards of two hundred thousand inhabitants, and consequently opportunities have been afforded me of viewing the business in a number of varying stages of its evolution.

In the early days we began in a modest way by providing a small natural park with music and attractions which were not very ex-

pensive. As the city grew and lines were extended, both urban and suburban, we established and maintained for a number of years two high-class and well-improved parks, one being located within the city boundaries, where it could be reached for a fare of five cents; and the other on a suburban connecting line where the round trip fare was fifteen cents in addition to the street car fare. At both of these parks flowers were extensively cultivated and displayed and amusements of many kinds were furnished, such as bathing beach, boating, dancing, vaudeville, music, light opera, balloon ascensions, and the like. No charge was ever made for any of these except for the use of bathing suits and boats and a small admission fee to the light opera. In the way of music, we have furnished some of the most famous bands which have visited this country and have frequently played so distinguished an artist and soloist as Signor Liberati and his band for weeks at a time. We have found the public taste in such matters capricious, demanding a frequent change of programme, and, as time has passed, a higher order of entertainment. On the whole, our efforts have been appreciated and the patronage has been generous, but it is difficult to say whether the profits have been sufficient to justify the immense amount of energy exerted in this direction, and we have finally altogether abandoned the maintenance of any such places by the company. Two parks, one city and the other suburban, are still maintained by independent corporations, at which, outside of boating, bathing, etc., music has been the only attraction furnished the present season, except a summer opera, to which a small admission fee was charged. We pay these park corporations a stipulated sum for furnishing our patrons with the free privileges of the parks. Meantime Kansas City has begun establishing its own public parks and as they become sufficiently improved to be generally used, it will be the policy of our company to encourage their use by the people in every reasonable and legitimate way.

We have always given liberal financial support and encouragement to the maintenance of a professional base ball club, and have always found the returns from this source satisfactory and I believe profitable.

Our company has given liberal financial aid and encouragement to the fall festivities which are of annual occurrence at Kansas City. They consist of a night parade by a local organization known as the "Priests of Pallas," representing, by a series of fantastic floats, scenes from history or mythology and a flower parade; and grotesque carnival parade in the day time on successive days, under the auspices of the "Kansas City Karnival Krewe." In these parades many brass bands from the section of country tributary to Kansas City are employed to take part. The festivities extend over a period of several days and are the means of assembling a large concourse of strangers in Kansas City. They are universally regarded as bringing much trade

and business to the city, and I am confident our company makes no investment in the way of amusement and entertainment to the public which brings better returns.

A noted military chieftain (General Hancock) spoke of the tariff question as a local issue, and such, in a large measure, I have found the subject assigned me for this paper; and I can only hope that something that I have said may prove to be of local use to many of you.

Respectfully submitted,

WALTON H. HOLMES.

DISCUSSION ON THE REPORT OF THE COMMITTEE ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

The President—Gentlemen, this subject is now open for discussion. It is a subject upon which nearly every one present can have something to say; and I trust you will take advantage of the opportunity offered.

I will ask Mr. Wyman to open the discussion on this paper.

REMARKS OF MR. C. D. WYMAN ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

Mr. Wyman, New Orleans—Mr. President, at your request and by reason of my desire to accede to the same, rather than because I think there can be very much said that will not to a certain extent traverse the grounds that Mr. Holmes has so admirably gone over in his paper, I am speaking perhaps only to re-emphasize some of the points that he has made, and yet I do so very willingly because I have had a considerable amount of experience on both sides of this question. I believed, and was very positive in my belief for many years, that a street railroad man should stick very closely to his line of work, and that he had very little freedom or time for going into the amusement business or any other sort of business that was not intimately connected with the daily operation of his cars, the management of his power plant and the thousand and one matters that the every-

day detail of his business necessarily claimed his attention. Therefore I used always to advise, "Keep out of it, don't go into the establishment of parks and the engagement of actors and actresses, musicians and all that sort of thing; do not establish skating rinks; let someone else in the dramatic line, some impresario or manager do it. If you do it at all, lease the privilege to some good man, encourage him in some way, but do not attempt to manage it yourself or devote your time to it."

I have discovered, however, that as Mr. Holmes very truly says, local conditions affect this matter to a very large extent. I have also discovered the truth of the old adage that if you want a thing done well you have to do it yourself, and my experience with the persons who are engaged in the purveying of public amusements to the people is that they are not altogether the most reliable people in the world, and that it is a pretty good thing for you, if you want to establish amusements upon that line, to take them under your own control and management.

I have also found in a great number of cities where I have had both official and consulting relations with Street Railway Companies and their representatives that this promoting of amusement enterprises was a very good method of stimulating the business. Now Mr. Holmes very rightly says that it was a proper thing for the street railway companies to aid in the development of municipal improvements like public parks, etc., and on that score there is philanthropic and humanitarian work, which we can do, especially during the summer seasons, for it is the universal custom in almost all cities to close the theaters and places of amusement during the heated term. The wealthy residents at that time very often to a large extent leave the city for some summer resort, and the other classes, those from which we derive the major portion of our income, are left without amusements and healthful entertainments and pleasant outing resorts other than parks or picnic grounds which often are not specially beautified, are not lighted in the evening and present no special attractions other than an open gathering place. The mass of the

people demand something more than bare parks. A growing taste for entertainment at once instructive and artistic is evident and must be satisfied. Therefore, on the humanitarian side of the question we can in a certain sense become public benefactors by furnishing amusement for those of our patrons who must remain in the cities during the summer.

Further than this, it has not been the custom in some cities in hot weather for people to go out much in the afternoon and in the evening. In the southern cities this is particularly true. With the sun beating down fairly warm, but not so warm as you often have it here in the North, our people do not go out for amusement much in the day time, and they were in past years not accustomed as a rule to go out much in the evening, other than to the homes of friends living in their immediate vicinity. Now we of the southern land have been trying to replace this practice with that of taking longer excursions to parks and amusement resorts, a practice we thought better for them and incidentally for us, and to this end street railway companies provided in quite a large number of the southern cities places of amusement, with music and attractions of one sort and another, by which has been cultivated to quite an extent the habit of outgoing of the people in the evening. Such a local condition may not prevail in many cities, but it exists with us. We have found in the last two or three years, by having some of the resorts such as have been mentioned, open in the evening, with music and attractions, the people are commencing to go out, and travel has been greatly increased. Therefore, wherever a habit of insularity on the part of the people exists, these amusement resorts, if well conducted, clean and pure in all their surroundings and in what is presented, will surely cultivate travel.

Now so far as the congestion of travel, which Mr. Holmes speaks of, on any particular line is concerned, I do not think such a condition is to be feared to any great extent. We are always willing to have a good deal of congestion in running a street railroad. It is always to be remembered that if a resort at the end of some particular line congests the travel upon that line, for the time being, it becomes an outlet for travel by other

lines and a feeder to others. In one city with which I am familiar, there is one line at the terminus of which is a resort of this character; but while the cars are leaving at a minute or half minute, and sometimes twenty seconds, headway upon that line, when it reaches the central part of the city the people immediately disperse to the other lines and the other lines get a large benefit therefrom. Thus I think very often the congestion which has been suggested as being possibly injurious is not so harmful as one might think and does not divert travel from other lines to the extent it benefits them by inducing travel in the line of excursion business. It seems to me that it cannot be doubted that the constant keeping before the people of a suggestion of pleasure, or interest, or something to amuse, of something to relieve the tedium of business, leading them to seek the same by traveling upon our cars, is a most beneficial thing for our business.

One thing we must always remember, that is that street railroad riding is after all a habit. As a habit it is growing with the better facilities we are constantly providing. We can look back a few years, when general riding was not so usual, when people walked more than they do now, when we sent out messages not by telephone but by messenger, and he walked. Now all these different improvements that we are introducing in the way of finer cars, of higher speed, of better facilities and, last of all, amusements, perhaps one of the most recent innovations, has a constant tendency to increase the habit of street car riding; and I believe that anything that has that trend and tendency is certainly very beneficial.

As regards the detail of these things, we might discuss them ad libitum, as to how they should be conducted, etc., but that is mechanical, and will easily suggest itself to the mind of almost any manager. The main question is, Does the providing of amusement resorts by the street railway companies pay? I think it does, and for the reasons I have suggested. [Applause.]

Vice-President Ely (in the chair)—Are there not some other members present who will discuss Mr. Holmes' paper? The Convention would be very glad to hear from them.

Mr. Davis, Williamsport—I ask if there are any roads which keep their statistics concerning their amusement business, separate and apart from their general business, showing exactly the amount of their travel which is due as near as they can tell to the amusement feature of their business. The experience in Pennsylvania among the small parks, is that the profits derived from the amusement business is not in proportion to the risk and the money spent, and in quite a majority of places the rule is that it is almost impossible for the manager to separate the hot weather travel on amusement lines from the travel due to the entertainment or park itself.

Mr. Holmes, Kansas City—I will say that as far as Kansas City is concerned, where we have the out-of-town parks, we have kept careful records of the business, because we sell tickets to the park; and I would be glad to talk that over with anybody or send him information. I recently received a letter from Mr. Goodrich, of Minneapolis, who has a great deal of experience in the railroad business, and especially in the matter of parks. At Lake Harriett they have a nice pavilion, and they are entirely relieved of the expense of maintaining the park, and Mr. Goodrich is firmly of the opinion that it does not pay their company to employ a band of music or any other attraction for that park. I can easily understand why it would not, because in our northern cities, and Kansas City is almost one, as compared with New Orleans, our summer season only lasts probably two and a half months, and we are compelled to depend upon the weather for our business. If the nights are cool travel is very light.

Speaking for Kansas City, I am convinced that we had better let the city furnish the parks and we contribute towards the music and attractions in the park. The real difficulty in establishing public parks in Kansas City was due to the fact that the street railroad companies had been quite liberal in providing parks. The people expected the companies to do it, and it is hard to overcome that feeling. The people would say, "What is the use of our being taxed with a lot of parks and their maintenance, when the street railroad people will

do it?" But these conditions are changed. We now have a beautiful system of parks laid out for our city by the local authorities, and the company looks forward to great pleasure travel, contributing something to their support in the way of amusement.

REMARKS OF MR. JOHN I. BEGGS ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

Mr. Beggs, Milwaukee—I quite agree with the general trend of Mr. Holmes' paper. For some years we have given in the public parks of the city band concerts for which the street railroad company paid the entire expenses, the city having no fund, as is the case in many cities. I thoroughly agree with that form of entertainment, and in behalf of our company we have a standing offer to duplicate any amount of money expended by the city, or raised by public spirited citizens for the purpose of giving music in the parks. Our experience, however, for two years was that where we paid the entire expense, as we did, taking the daily receipts of the particular lines leading to the resorts in which these entertainments were provided at the sole expense of the company, that we never got back at the outside more than seventy-five cents for each dollar spent. While we seem to have an increase of gross receipts, which increased our gross receipts tax likewise, and made us seem to be doing an abnormal business, so far as dollars and cents left in our treasury went, we were the losers.

I am glad to hear this question discussed at this time, because we are having urged upon us now, by individuals, a scheme by which we would be called upon to put up a large amount of money for maintaining special amusements of this kind. From my experience and observation in various cities, I do not believe that it pays a street railway company to go into the amusement business. I think there is a great deal of misapprehension many times as to the manner in which

this money is spent, by concentrating all the energies in this direction in one particular point of the city, and giving amusements at that place. They fail to recognize that much of the money spent there might have been spent in other sections, and with better effect; not to give so much special prominence to one point. I think our experience this year, where we have spent no money whatever on public entertainment, has convinced us pretty thoroughly that we are very greatly the winners by a refusal to contribute the entire amount necessary. I do believe in promoting the public parks of a city, as maintained either by the municipality or by public-spirited citizens, but I seriously doubt whether any of these expensively maintained entertainment resorts pay the companies that promote them. I think it is because they have not carefully analyzed the total cost nor the effect upon the general system, and if the same enterprise had been expended in improving the facilities for travel, in making their cars more cheerful and comfortable, and improving the roadbed, it would bring much larger returns than in spending it for a couple of hours of diversion in the afternoon or evening. [Applause.]

Mr. Harrington, Camden—We have a park, and we have had considerable trouble due to the fact that the people would come and take the best seats, and would not ride on our cars. The park is very near the city, and in order to guard against the above, we furnished a ticket on the car to each passenger desiring to go to the park, and charged an entrance fee of ten cents to others. This method effectually shut out the objectionable element, and by the use of the ticket we determined the number of people going to the park. We find that our travel is increased. We receive, however, only about seventy per cent income from the park of what the park costs to operate. The travel on the road, of course, is increased, and we can tell from the tickets just the amount. We think we are making some money, but whether we would make the installation and furnish the park if we had to do it over again is a question.

REMARKS OF MR. JOHN FARSON ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

Mr. Farson, Chicago—The coming railroad manager who will be highly esteemed will be the man who not only gives his attention to reduced cost of operation, to the question of the very best electrical equipment, to the manner of the very best handling of his cars, to seeing that his track is kept in the very best condition, but he will also devote a large part of his thought to the question of the stimulation of travel. As has been well stated, the matter of riding on the cars is largely a question of habit, and in many cases to-day where roads are operated at a loss, or just about even, or at a small profit, a little attention on this line would mean dividends to the stockholders. From the standpoint of a stockholder I am very much interested in this question. It seems to me that the practical operators of roads could take this question up and study it from all its points of view, with great interest to the people who own the stock. Conditions, of course, vary. In many small towns of from ten to thirty thousand people, a little attention paid to the operation of a park, either directly by the company or by inducing someone to operate it for the company, would mean to-day a dividend to the stockholders. The street railway, like other institutions, needs leaders and not followers. At the head of these institutions should be broad-minded, wide-awake, up-to-date men, who will study carefully the conditions which surround them and use every effort and energy for the purpose of bringing money into the treasury of the company. [Applause.]

Mr. Claflin, Boston—We of the Norumbega Park, to which park you gentlemen are invited, have had a very different experience from some of the gentlemen who have spoken. We have adopted a different system from most of the street railway parks in Massachusetts, and it has certainly been a great success for the park and the railway. We have adopted the practice of charging an admission fee for the park and dis-

criminate in favor of our railway patrons. Our railway carries its patrons a distance of five and one-half miles for five cents. We sell on our cars for fifteen cents a round trip ticket, which includes admission to the park. We charge people going on foot or bicycle ten cents admission. The result is that the railway patrons get admission for five cents and the other people pay ten cents. That has a tendency to bring passengers to the railway company, and it has been a great success with us. The result has been that the park has maintained itself and costs the railway company nothing whatever for its maintenance. The revenue derived from the road has been net. Our line is a small one, but the patrons there have been worth nearly six hundred thousand fares to us, at five cents each, as the result of the park's entertainments. The admission to the park is through a registering turnstile, and we know where the patrons come from. This statement may be of interest as showing circumstances where a park can be made to maintain itself as an enterprise, and the railway not be put to any expense. The admission fee is small. We furnish theatrical entertainments, have a zoological garden, band concerts and other things, and manage to make the admission fee pay the entire expense, and also the interest on the money invested in the park, and the railway company gets its revenue net.

REMARKS OF MR. ALBION E. LANG ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

Mr. Lang, Toledo—I want to offer a few suggestions that may be of value. Our city has about one hundred and forty thousand inhabitants. The Toledo Casino Company conducts a place of amusement on the lake shore about five and one-half miles from the center of the city. The company is controlled by some of the stockholders who are interested in our street railway company. It was not built by its present owners, but by parties who owned a competing street railroad, which has since come into our possession. Personally

I had some misgivings about the value of the enterprise when it was started. When it came into possession of the present owners some of the mistakes of its former owners were rectified; notably the imposition of a charge for admission to the ground, which had theretofore been free. At the outset a person who paid the street railway company ten cents could gain free admission to the grounds and a free seat in the casino building, where acrobatic, vaudeville and light comedy entertainments were given from two to four in the afternoon and from eight to ten in the evening. All seats in the building were free to those who had come to the grounds by the street cars, and paid the ten cents fare. In addition to the amusements in the casino building, there was sold on the grounds soft drinks, confectionery, etc., and other amusements, such as the merry-go-round, rack dolls, and the like, were provided for entertainment and revenue. While the enterprise served to stimulate travel for the street railway company, it was not self-sustaining and each year lost money. It was said to have cost in the neighborhood of seventy-five thousand dollars in land and buildings, and believing that it could be made nearly, if not quite, self-sustaining by imposing an admission fee of five cents we made bold to announce two years ago that parties desiring to take the ride on the street car and enjoy the amusements should be required to pay fifteen cents for the round trip (thus making it correspond in charge to what the gentleman from Boston has just stated), five cents of which went direct to the casino company. As all who entered were registered by turnstiles we knew at all times how many persons were going in. Not only this. We removed some of the free seats, substituting a better seat, for which we made a charge of ten cents. We found this change worked so well that we later put in two rows of reserved seats in the gallery. Many citizens and friends of ours said we were making a great mistake in imposing this admission fee of five cents and charging for reserved seats, but we tried it and it has been eminently successful. We also have boxes that will seat four persons, which sell for twenty-five cents. At the close of last season our

receipts were just about even with our expenses, but this year the casino company will net about six thousand dollars, including a fair charge for depreciation upon buildings. The gross earnings of the railway company will show an increase of about fifty thousand dollars, due to attractions offered by the casino company.

Now I realize that conditions vary in different cities, and that what might be a desirable thing in Boston or New York might not be so desirable in another place of smaller population, vice versa; but if any of you are further interested in this subject I will be glad to give you any additional information I can, hence will not take any more time in the convention making further remarks upon this subject.

Mr. Davis, Williamsport—The practice in Boston and in the New England States has been for the railroads operating parks to furnish amusements and rely upon their car fares alone to reimburse them for their outlays. I should like to have the experience of the managers of these parks as to whether they think it is profitable, and how long such parks have been operated at a profit.

FURTHER REMARKS OF MR. C. D. WYMAN ON "TO WHAT EXTENT SHOULD STREET-RAILWAY COMPANIES ENGAGE IN THE AMUSEMENT BUSINESS."

Mr. Wyman, New Orleans—I dislike to take the time of the convention by speaking again upon this subject, but inasmuch as the experience of the gentlemen who have already discussed the question seems to have been so very different from mine, I perhaps may be permitted to explain somewhat more in detail the basis of and the causes which have led me to the conclusions I have already expressed, viz., that within certain sections of the country at least, the providing of amusement by the street railroad companies for the public is likely to be a profitable one. I am aware that the conditions which affect this question in one part of the country do not prevail in another, and that what might be a very effectual bar to the engagement on the part of a street railroad com-

pany in the amusement business in New England might have no weight with a Southern company. Perhaps the most prominent differences of conditions prevalent between the Northern and Southern States is the length of the heated term, or what might be called the summer amusement season.

In my own city, New Orleans, we have the advantage of a long season, lasting from the middle of April to September, and frequently our pleasure resorts and parks are well patronized during the latter month, and even into the winter.

The company I have the honor to represent, besides contributing to the providing of musical and other attractions in the city parks during the summer season, also maintains a resort of its own on Lake Pontchartrain, about six miles from the city. To it we operate an electric suburban line, upon which we run electric trains and charge a round trip fare of fifteen cents. The grounds we occupy stretch along the beach of the lake for a distance of about a mile. We maintain a very handsome garden, laid out with attractive walks, flowers and shade trees and also have on one end of the same an immense open platform fronting the lake and flanked on either side by pavillions and hotels, which we also own, but lease out.

Upon the platform is located a band-stand and a stage upon which vaudeville performances are given nightly. From the platform we maintain a pier into the lake, and adjoining the grounds are bathing houses, boat-houses and side-shows of various descriptions, such as chutes, merry-go-rounds, illusions, etc., from the proprietors of which we derive a small rental in the way of a return for privileges extended.

We provide at our own expense a fine band and amusement performers and give a nightly concert and vaudeville entertainment, for which no charge is made. We light the grounds electrically, provide seats, sufficient to accommodate an attendance of at least five thousand, and our weekly expenses are in the vicinity of two thousand dollars.

Other than the small amount of rental derived from privileges of which I have spoken, we rely entirely for re-imbursement upon the carfare of passengers riding on our line to the

resort. We do not attempt, however, to exclude from our park or garden, parties who go to the place upon bicycles or in carriages, nor do we charge any admittance fee whatever.

We keep an accurate record of our operating expenses and our receipts, entirely separate from that of any of our other lines, and we find that the proportion of receipts to expenses upon the lake line, even including the cost of the amusements, varies but little from that of the ordinary electric lines to other parts of the city, by reason of the fact that the extra inducement offered brings us a large return upon said line in the way of increased travel.

It must be remembered that in our city during the summer we have but few visitors, our main reliance for street railroad business being upon our own population, and it is our impression that to secure the largest result from the class of people who remain in our city during the summer, we must needs offer the very best attractions at the least possible cost, and, therefore, we believe that the free admission feature of our enterprise is a vital one, and pays.

We carry a passenger twelve miles for fifteen cents, giving him a pleasant and rapid ride to a delightful resort, where he can enjoy good music and be entertained by artistic performers, giving him in total a performance which would cost him half a dollar almost anywhere else, and such an offering attracts to our resort from ten to twelve thousand people when the weather is pleasant on every Sunday evening, and from four to five thousand people as an average on week day evenings, and the margin of profit, therefore, with such an attendance will be evident.

The providing of such amusements has been the result of several years' experience, entered upon tentatively at first with few and rather cheap amusements, and somewhat meagre accommodations, but we found that every increase in attractiveness and each betterment added in the way of finer entertainments, has been met by a corresponding increase in profit, and this profit is not only shown upon the particular line which is operated directly to our West End resort, but is reflected in the increased riding upon the other

lines in the city which feed and are fed by our West End line. Further than this, the fact that we have a pleasure resort of this kind has greatly stimulated our "Special Trolley Car" patronage, which, during the past year, has been very extensive.

Thus I am compelled to reiterate what I have said in speaking a few moments ago upon this subject, namely, that it is my opinion that where the season is sufficiently long and where the local conditions will permit, a railroad company can profitably, when other places of amusement are closed, enter upon the business of furnishing amusements free to the public, and rely upon the additional carfares thereby gained to repay them for their expenditures.

Mr. Holmes, Kansas City—I notice a gentleman in the audience who was with our road in Kansas City for four years and laid out the first park for our company. He has had a good deal of experience with parks since that time, and we ought to hear from him. I refer to Mr. Chapman.

Mr. Chapman, Chicago—I am somewhat rusty now on the amusement business, but I can give a little experience at Grand Rapids, Mich., where the lines were converted from cable and horse cars to electric, and a very pretty park was constructed at the lake, where the average haul was four miles from the center of the city. We commenced, as nearly everybody else has done, in a small way. The first attractions were merry-go-rounds and things of that kind. It gradually became more and more expensive, better music, and unfortunately more and more bicycles, so that while the patronage largely increased, the expenses increased in much greater proportion. Since I severed my connection with the Grand Rapids property, they have found it advisable to build a small auditorium and help out their receipts by charging admission to the reserved seat section of this auditorium, allowing the people to stand on the outside without extra charge. They furnish attractions costing from four hundred to six hundred dollars per week, and are making the amusement feature more successful than it has been since the intro-

duction of the bicycle. Before that time it was very satisfactory.

Mr. Bean, St. Joseph—I see Mr. F. W. Thompson, of Muskegon, Mich., in the room; and I suggest that we hear from him.

Mr. Thompson, Muskegon—Mr. President, I came to listen, not to talk. It is true that we have a park at Muskegon, and also a pavilion and theatrical attractions. The last three years we have conducted the attraction part of it on a little bit of a stage attached to the main building, and have found it fairly profitable. This year we went to an expense of two thousand dollars, and built a properly constructed addition for theatrical entertainments, with five hundred and eighty-four reserved seats, and the stage lighted by electricity. Up to this year we allowed everybody in the park without any restrictions. This year we allow no one in the pavilion unless he purchased tickets on the cars. Passengers may go into the old part of the building, which has flat bench seats with a capacity of seven hundred, for the fare. The reserved seats cost five cents extra, and this year we have more than paid the cost of our theatre from the reserved seats. The increased travel in the months when the weather was fine was one thousand dollars. A good park, with good attractions, in my opinion, will be a paying venture for a street railway company.

Mr. Cahoon, Elmira—One point does not seem to have been touched upon by any of the speakers, and that is the increased liability to accidents. If we increase the travel by means of amusements or parks or entertainments, in carrying the greater number of people we are thereby inducing to go to these places, we certainly increase very materially the chances for accident; and it would seem to me that in considering the matter of expenses and the question whether these parks pay or do not pay, the cost of damage suits and the increased liability for damages that are incurred should be considered. I think that would open up a profitable field for discussion. This amusement question is becoming a very vital one, especially to the smaller roads. The road which

I represent is of that class. We have a city of about forty-five thousand inhabitants and at the end of our line is situated a public park. We cannot control any of the privileges, but we can pay all the expenses for having amusements there, and unless we do that we do not get any travel there to speak of. The question of damages has come up on two occasions, and I think largely on account of the greater number of passengers carried incident to the amusement. I should like to hear something of the experience of others, and as to whether they reckon there is a profit in the amusement business, taking this question of damages into consideration.

Mr. Jones, Memphis—It seems to me the whole question is one of locality and conditions. Take the case cited by Mr. Wyman. He has a resort which was there and was profitable before the electric road was in operation. I have often paid five dollars for a carriage to drive out there. It is a beautiful place and the more advantages he gives the people the better his patronage. Take a park in Boston. I do not see how a park could be profitable here, because the season is short, unless you have a park which people will visit in the afternoon. If you expect people to go to a park in the afternoon at New Orleans and Memphis, it would be an absolute failure, because they do not go out at all except in the evening. We think we can do more in that line by having a park for the reason that our season lasts about eight months. Our people begin to go out in the evening early in April; and I have seen the temperature on Christmas Eve seventy-eight degrees with us. We think that sort of a place would be better than it would be up here. I think the question resolves itself down to one of local conditions.

Mr. Heft, Meriden—I am glad to observe the gentlemen are living up to the traditions of street railway men in being honest and telling us the truth. We are operating a park we inherited with the road. The former owners had spent about forty-five thousand dollars on this park. They had put up posts to tie horses to, put launches and boats on the lake that everyone might take a ride, they built a casino and a switch-back road. They provided baseball grounds, and

all these things were free to every man who chose to enter there. I want to say to you that when the balance sheet was figured up at the end of the year our experience was about the same as the gentlemen from Milwaukee, and I think the street railway men of to-day have run mad on this question of amusements, providing everything without any recompense whatever. If we are going to make these parks pay, they must be run upon a business basis, the same as the gentleman over there on the left (Mr. Claflin), who charges an admission fee. We must not forget that when we add to the receipts in this way we add to the operating expenses of the road, all these expenses must be figured in or at the end of the year we will show a loss. I am very glad to hear from the gentlemen on this question; and it seems that the only men who are making any money, with the exception of Mr. Wyman, who lives in the sunny South, where everything comes to you free, are those who charge an admission to their parks.

The President—Gentlemen, if there is no further discussion on this subject, we will take up the report of the Nominating Committee. I understand that the Committee is ready to report.

REPORT OF THE NOMINATING COMMITTEE.

Mr. Bean, St. Joseph—Mr. President, the Committee appointed to nominate officers and report a place for the next meeting, presents the following report:

Boston, September 6, 1898.

To the President and Members of the American Street Railway Association:

The Nominating Committee, appointed by the President yesterday to select a place of meeting and nominate the Officers and Executive Committee for the ensuing year, desires to make the following report:

For President,
CHARLES S. SERGEANT, Boston, Mass.

For First Vice-President,
HENRY C. MOORE, Trenton, N. J.

For Second Vice-President,
ERNEST WOODRUFF, Atlanta, Ga.

For Third Vice-President,
WALTON H. HOLMES, Kansas City, Mo.

For Secretary and Treasurer,
THOMAS C. PENINGTON, Chicago, Ill.

EXECUTIVE COMMITTEE.

ALBION E. LANG, Toledo, O.
GEORGE A. YUILLE, Chicago, Ill.
FRANK G. JONES, Memphis, Tenn.
JOHN I. BEGGS, Milwaukee, Wis.
IRA A. McCORMACK, Brooklyn, N. Y.

The next place of meeting, CHICAGO, ILL.

Respectfully submitted,

W. WORTH BEAN,
Chairman,
E. C. FOSTER,
ERNEST H. DAVIS,
JAS. R. CHAPMAN,
H. C. PAYNE,
Committee.

Mr. Bean—The following is an extract from the minutes of the meeting of the Committee:

Moved and Seconded—That the next meeting of the Association be held in Chicago, Ill., provided that facilities satisfactory to the Executive Committee as to a proper hall for Exhibition and Convention purposes shall be furnished without expense to the American Street Railway Association. Carried.

W. WORTH BEAN,
Chairman of Committee.

The President—Gentlemen, what action will you take upon the report of the Committee on Nominations?

Mr. Shaw, Boston—I move that the report of the Committee be accepted, and that the Secretary be authorized to cast the ballot of the Association for the gentlemen nominated. Carried.

The President—I appoint as tellers Mr. Chapman and Mr. Ely.

The Secretary—I deposit the ballot for the gentlemen nominated.

The President—The tellers report that the ballot has been cast unanimously for the gentlemen nominated, and they are declared to be elected. [Applause.]

Mr. Farson, Chicago—May I not compliment the Committee on this admirable report and the splendid selection of officers, and also upon their selection of Chicago for the next place of meeting? I may say, on behalf of the street railway people of Chicago, that we will do everything in our power to make the convention interesting, profitable and instructive. We will welcome you, gentlemen, with open arms. [Applause.]

APPOINTMENT OF COMMITTEE ON THE CARRYING OF UNITED STATES MAIL ON STREET RAILWAYS.

The President—I will appoint as the Committee on the Carrying of United States Mail on Street Railways, as provided for in the motion adopted yesterday, the following gentlemen:

John T. Burnett, Boston.
Henry C. Payne, Milwaukee.
Ira A. McCormack, New York.
D. G. Hamilton, Chicago.
W. S. Dimmock, Council Bluffs.

The President—I have been informed that Mr. T. Y. Dzushi, Chief of Finance and Manager of Stores of the Imperial Government Railways of Japan, and Mr. Koran Sugahara, Chief Engineer of the Kobu, and of some other street railroads soon to be built in Japan, are in the room, and have been attending this convention since it opened, and I think that in some way we should express our pleasure in meeting them.

Mr. Ely, Niagara Falls—I move you, Mr. President, that the privileges of the floor be extended to these gentlemen and that they be invited to address the convention. Carried.

REMARKS OF MR. KORAN SUGAHARA, OF JAPAN.

Mr. President and Gentlemen: It is a great privilege and honor to have the pleasure of meeting you on this memorable occasion, and to occupy a seat in this national convention of street railway men of this great country. I desire to express my sincere gratitude for your hospitality extended to me as well as to my friend, Mr. Dzushi.

Indeed, it is very difficult for me to express my feelings and sentiments to my heart's desire, because I am not accustomed to your language. However, it may be some entertainment to you that an alien from the Land of the Rising Sun ventures to address you in broken English, instead of speaking to you in her flowery and poetic language.

Japan is achieving a great deal of material progress, and is striving to accomplish in rapid succession what she learns from abroad. Your venerated Commodore Perry opened our gate to Western civilization some forty-four years ago, and to-day your generous discoveries and inventions lead us hand in hand in the march of material civilization, for which we are greatly indebted to your people and country. To tell you of my experiences regarding the construction of street railways in Japan, I wish to inform you that I was the first engineer of a private company which has built steam street railways for passenger traffic in Tokyo, in 1896 and since then. I am naturally devoted to the investigation of street railway construction, and you can hardly imagine how interesting and helpful it is to me to be present in this great convention.

The progress of our street railway system is very slow, and it is in a primitive stage as yet. For instance, there are only about sixty miles of street railways in Japan, and most of them depend on horse power, except the Kyoto and Nagoya electric lines. Several electric railways, however, have been projected in different cities and towns throughout the country. We are firm in our belief that in the near future Japan will be found a network of electric street railways. Should I engage in the construction of street railways in Tokyo after returning home, and apply the knowledge I have gained here, I shall be very much indebted to you all. We have about forty thousand jinrikishas and ninety thousand wagons drawn by men as a means of transportation in Tokyo, and these greatly interfere with the progress of street railways. Notwithstanding these difficulties, the Tokyo horse car railway companies pay, on the capital invested, thirty per cent dividends annually, and our steam railroad company pays thirteen per cent. We have no doubt that to build street railways in Tokyo is one of the most promising enterprises.

It is my great desire that our country shall progress in such a degree that when any of you shall come to Tokyo you may go to any place in the city by street cars, not by jinrikisha, and that our country

may be considered one of the industrial countries of the world, and not only as a country of beauty and curiosity. Thanking you again for the kind privileges given us, and hoping you may all enjoy the blessings of health, liberty and prosperity, I beg to conclude my remarks. [Applause.]

The President—Gentlemen, I am sure that I express the feelings of all the members of this convention when I say that it is a great pleasure for us all to meet you. I take pleasure in presenting you a badge that will admit you to all our sessions and every exhibit in the building, and I believe to every home in the city of Boston. I trust you will carry these with you with our best wishes. I also desire to present you with tickets to the banquet to-night, and we will be glad to have you join us at that time. [Applause.]

REMARKS OF MR. T. Y. DZUSHI, OF JAPAN.

Gentlemen: It affords us great pleasure to meet you here. I desire to express our hearty thanks for your kind invitation. [Applause.]

The President—Gentlemen, I was told this morning by several members that if the Committee on Nominations made their report before the close of the session, that our members would leave the hall and go to places more attractive. I trust that this will not be so, because we have ample time in which to read the next paper and discuss it, and adjourn in time for the trip this afternoon.

VOTE OF THANKS TO THE MASSACHUSETTS STREET-RAILWAY ASSOCIATION.

Mr. Payne, Milwaukee—Before the gentleman reads his paper, and before the members scatter, as I am afraid they will immediately after the paper is read, and we will not have as many members present at a later session as we have now, I desire on my own behalf, and I have no doubt on behalf of all the members of the Association, to return to the members of the Massachusetts Street Railway Association, and to the members of the Local Committees, and all those who have interested themselves in entertaining us in this city, our

sincere thanks for the magnificent manner in which they have done their work. I think it is not too much to say that the arrangements for this convention have not been excelled in any place where we have met, certainly not where I have been in attendance upon the meeting. It is but proper that we should make known our feelings in that regard, and I offer a resolution that the Secretary be instructed to tender to the persons mentioned the heartfelt thanks and appreciation of the members of this Association.

Mr. Chapman seconded the motion, which was duly carried, amid applause.

VOTE OF THANKS TO RETIRING OFFICERS.

Mr. Payne, Milwaukee—One thing more. I do not know whether it is the proper time, but I think the members of the Association will desire to place upon record their appreciation of the manner in which the officers during the last year have performed their duties; and I therefore desire to move that the thanks of the Association be tendered to the retiring President and the other officers and members of the Executive Committee of the Association for the faithful performance of their duties.

Mr. Payne put the motion, which was unanimously carried.

President Lang—I thank you very much, gentlemen, for this expression of your appreciation. We have only done our duty, and we hope the result of our labors will be beneficial to all who have attended our meeting and all who may read the report of the meeting when published.

VOTE OF THANKS TO THE LADIES' RECEPTION COMMITTEE.

Mr. Ely, Niagara Falls—I move that a special vote of thanks be extended to the members of the Ladies' Reception Committee, who have been so untiring in their efforts for the entertainment of the visiting ladies, and who have expended so much time and pains in making their stay pleasant here. Carried.

The President—We will now proceed to the next paper, which is entitled "Inspection and Testing of Motors and Car Equipments by Street Railway Companies," which will be presented by Mr. Frederick D. Perkins, Electrical Engineer, Toledo Traction Company, Toledo, Ohio.

REPORT OF THE COMMITTEE ON "INSPECTION AND TESTING OF MOTORS AND CAR EQUIPMENTS BY STREET-RAILWAY COMPANIES."

Mr. Perkins read the report as follows:

The American Street Railway Association—

Gentlemen: In discussing this subject I have decided to speak of inspection and testing separately. The work of inspection is to be attended to principally in the car-houses, with a small amount of attention while cars are in service. The testing is to be done in the repair-shop. In no direction can a railway company save money, or increase dividends more rapidly, than by having its equipments thoroughly inspected by competent men, working systematically under intelligent direction.

After a car has been through the repair-shop and is again placed in service it is naturally supposed to be in first-class condition. It comes then under the immediate supervision of one or more men, presumably the day and night foremen, whose duty it is to keep that car in good condition for as long a time and with as little expense as is possible. These men should be thoroughly acquainted with every detail of that car. Instead of examining cars once in thirty or sixty days, a daily inspection is necessary.

I have thought it expedient for the purpose of setting forth my views on inspection to describe the work as being carried on in a modern car-house containing fifty equipments, and arranged for the easy handling of the cars, so that no extra help will be required for that purpose.

In dealing with the inspection of cars in this car-house, we believe better results can be obtained by giving to each man some particular branch of the work, rather than assigning to him a certain number of cars and expecting him to do all the work required thereon. For instance, it is safe to assume that the controllers will be kept in better condition if the responsibility for good repairs be placed with one man only than would be the case were this branch of the work made a part of the duties of several workmen, in conjunction with all the other repairs found necessary. If this be true in regard to controllers, it will be found equally pertinent to all the other items of car

inspection. There is also this advantage—the men will carry the tools and material for one particular kind of work only, whereas, if they had a multiplicity of duties to perform, it would necessitate their having a large assortment of tools and material, or wasting considerable time in going back and forth to the stock-room.

In this modern car-house five men will be required. This estimate includes only the repair men proper and not the foreman of the car-house, whose duties in connection with handling of motormen and conductors, sending out cars and similar work would require so much of his time that he could only have a general knowledge of the work of inspection in the car-house. Two of this number would be required to grease and inspect the motors, one to keep the controllers in repair, one to take care of the trolleys and to assist in the care of trucks and car bodies, and one to have charge of the trucks and car bodies.

The most vital parts of the equipments are the different parts of the motor, viz.: Armatures, fields, bearings, brushes and brush-holders. The care of this part of the equipments should come under the head of greasing, and on the manner in which this part of the work is done depends, to a large extent, the frequency with which the cars will break down while in service, and also the amount of repairs necessary to keep them in operation. Oftentimes the most ignorant and cheapest men are given the place of greaser. On the contrary, it is a position where intelligence and thoroughness are imperative. In order that he may have sufficient time for thoroughness in detail, the greaser should not be expected to ring alarms or attend to other matters of a miscellaneous nature; but should be held responsible for his own particular work.

The car should pass into the greaser's hands the first day after it is on the road and every second day thereafter. He should examine thoroughly the brushes, brush-holders, gears, pinions, bearings and commutators. Of these parts, the care of the bearings and commutator is the most important and should, therefore, receive the greatest amount of attention. The manner of caring for the bearings is very simple. They must be well supplied with grease or oil and care must be taken that they are kept free from dust and grit, and also that the grease feeds properly.

In the matter of the care of commutators, electricians seem divided in their opinion as to whether they should be sand-papered or not; personally, I am not in favor of it. Instead of temporizing the commutator by sand-papering it, and thereby simply putting it in shape for one more day's work, I would get at the bottom of the trouble and either make a commutator by some preparation of mica and copper which will not spark, or, if the trouble lies deeper, remedy it by remodeling the entire motor. This may seem to be an heroic measure, but the end will justify the means.

I think, however, that usually the trouble is not in the commutator, nor with the motor, but in either the brushes or brush-holders, or both; and it is probable that with proper adjustment, and with proper care and treatment, we should find the trouble obviated, and sand-papering of commutators unnecessary. When speaking of the treatment of brushes, we refer to a treatment of oil or something similar.

The writer has personal knowledge of a large road where common brushes were used without any treatment or care except to replace as needed, and it seemed as if the man who used the most brushes was given the credit of taking the best care of his motor. The average life of brushes on this road, with the above conditions of the commutator sand-papered every day, was six days. Subsequently the sand-papering was stopped entirely, and the brushes were removed every six days and properly treated in oil. The life of brushes under this treatment was increased from six days to from forty to sixty days. The trouble with commutators, which had before been great, was reduced to a minimum; in fact, almost entirely averted. It is possible that under some heavy conditions the practice of sand-papering must be kept up, but it must be accomplished in a different manner, and, instead of indiscriminate sand-papering, it must be applied very sparingly.

Not later than every fourth day every controller and switch should come under the notice of the man who has charge of those parts. The main point is to clean thoroughly, using a little vaseline on the contacts. The parts that are worn should be touched up with a file, or should be sand-papered, and if badly worn should be replaced, so that at least every fourth day the controllers will be sent out in first-class condition. This man can also examine the car-wiring, lamp fixtures, headlights, and all similar parts.

The fourth man will have the care of the trolley poles and wheels. These should be carefully looked over each night and oiled if necessary. The man who attends to this part of the equipment will also have considerable time to devote to general inspection of the car bodies and trucks under the direction of the general inspector. Under the scrutiny of these two men should come all the details of a car body, such as grab handles, window catchers, curtain fixtures and similar parts. These should be carefully attended to each day, in so much as the reputation of the road will suffer in direct proportion as the attention to these small details is neglected. The public is exceedingly exacting in regard to the manner in which its comforts are catered to in these minor details; and the degree of excellence which characterizes this part of the work will be largely instrumental in moulding and fashioning its opinion of the road and of its servants in management.

The matter of car cleaning will not be considered in this paper, as it is not directly connected with the subject in hand.

After having touched upon the subject of inspection in the car-house, we have to deal with outside inspection—that is, inspection on the road by inspectors, motormen and conductors. It may be a good plan to have outside inspection, and it is often advantageous if not carried too far; but I do not believe it is desirable to have a large force. My reason is this, that but very little of the time devoted to this line of inspection is really used in looking over the equipment, but must necessarily be consumed in getting from one car to another and in waiting for opportunities, and most of the trouble located by these inspectors is not of such a nature as to require immediate attention, and if it were the inspector could not make the necessary repairs without taking the car to the car-house.

Troubles of a serious nature, such as would require immediate attention and taking the car out of service, should be easily detected by the motorman or conductor and reported at once to the proper official. It may not be entirely irrelevant to speak here of the relation of motormen and conductors to the inspection of cars. It has been proven that it is usually a waste of time, and very little has been accomplished, by attempting to instruct motormen and conductors other than in the simplest ideas of electrical problems, for while on some roads there may be a number of old motormen who have a fair idea of electrical equipments and whom it would probably be safe to allow to locate existing troubles, it would be difficult to draw the line between the men competent in this direction and those wholly lacking in such knowledge. I know of nothing more distasteful to passengers unwillingly detained than sitting in a car impatiently waiting while a motorman works over some part of the equipment in a vain endeavor to locate some trouble, the very nature of which he has not the faintest idea, and quite likely, at the same time, interfering with the movement of several other cars.

Of course, contingencies might arise where men would be justified in attempting to locate trouble on their cars, but, as a rule, they should not be allowed to do so, as the practice is wrong. If they clearly understand the brake mechanism, the right manner in which to apply the power to the motors, how to use the cut-out switch in the controller, and have a clear conception of the general rules as promulgated by the company, this will be about as far as it is profitable to teach them.

But while we may not allow them to make repairs, or experiment with the equipment, we must educate them to the necessity of being able to immediately detect any unusual or threatened condition, and to at once report the same. In fact, they must be made to feel that it is their first duty to report everything that is working to the possible detriment of the company, and if we properly impress them with the

importance of these details as outlined above, we shall have established a means of quickly locating trouble on the road, and that without the aid of special inspectors.

Next comes the matter of testing. The service which we will obtain from our equipment depends largely upon the manner in which the repairs are made. If the repair work be rushed through with the idea of going over as many cars as possible in a short space of time, and with little or no regard for the thoroughness of the work, we must expect the necessity for repairs to increase to an alarming extent. If, on the other hand, we make our repairs with the idea that work thoroughly done will have a tendency to greatly decrease the liability to breakdowns while the cars are in service, and correspondingly reduce the amount of work to be done in the repair-shops, we shall naturally consider the best means not only of doing the work, but of definitely determining its condition when finished.

To do this properly we must resort to the practice of testing and we use the word "testing" in a broader sense than it usually signifies. For example, all material furnished, such as tape, mica, paper, etc., must be kept up to the standard, and to accomplish this everything used should be carefully examined, or, under our classification, tested.

We must begin testing in the purchasing department. In the purchasing of supplies a great deal of trouble is often occasioned by changing the kind of material furnished. This is probably more noticeable in the case of small roads. Now, while there may be no great difference in the quality of goods furnished, or if any one of the many different brands were used exclusively, it would give satisfaction; yet the very fact that many different kinds are used has a tendency to produce a lack of carefulness in the details of the work which almost invariably show in the general result. This will be noticeable in several ways. The workmen will take one of the following views of the matter: He will either think the management is careless in the matter, and, as a consequence, he will immediately commence to drop from the former high standard of work; or he will think that there is nothing essential about the quality of the material used, and acquire the pernicious habit of utilizing anything which may happen to be handy.

When a workman once detects what seems to him to be a lack of thoroughness in any part of the work which has to do with his department, you have at that moment allowed to enter that department a spirit of carelessness, which will develop very rapidly; and, unless quickly suppressed, will, in a short time, produce disastrous results.

To attain a condition of thoroughness in any line of work may have called forth a great deal of hard labor, the expenditure of much time and money, and the exercise of patience, skill and forethought; but how slight a relaxation of vigilance on the part of some official trusted with the maintenance of the good conditions acquired, can, in

an incredibly short space of time, undo the good work accomplished and cause a retrograde movement along lines which had promised so favorably.

If, however, we have to allow only one kind of material in the repair-shop, the question naturally arises as to how we can avoid being behind the times in the matter of different kinds of supplies, and also in the manner of their use. The answer is, We must have an experimental-room, and here must be tested samples of all supplies and materials before being contracted for by the purchasing agent. I do not mean to say that this room must necessarily be entirely separate from the repair-shop, as this would naturally require a large amount of machinery which we already possess and would not care to duplicate. But this room must be considered by the employees as one in which they are not directly interested other than as they are required to work on some portion of that which is being tested; but the special testing and all the instruments for the same must be in a separate department; and if it is not possible to have a separate room, at least a part of the repair-shop should be partitioned off for this work, as the amount of time wasted by the employees of the shop attracted from their regular duties by the testing of some part of the equipment or material on the floor of the repair-shop proper would, if saved, more than compensate for the expense incurred in the creation and maintenance of such a room.

Having thus arranged this separate apartment for practically all testing purposes, and having impressed upon employes and workmen that herein will be settled all questions relating to work done and material used, we have accomplished one of the results aimed at, in that we have prepared ourselves to impress upon the men that any material placed in their hands for use in repairs has previously been thoroughly tested; and this will, we think, tend to raise the standard of work, as any results of poor workmanship on their part cannot then be laid to faulty material, thus giving them an incentive to conscientiously deal with the established and known good material.

We are now able to take anything in the line of new material or any new ideas regarding the use of the same, or any electrical problems which may arise, and ascertain their value without interfering in any way with the regular work of the shop or of the employes.

It is neither necessary nor desirable that the workmen should know the merits or defects of whatever comes to the testing-room; but some of the employees should be allowed to become familiar with a great deal of the work of this room. They will not only be more valuable for the knowledge thus obtained, but some of the work must of necessity be delegated to some other person than the electrical engineer. But at all times it must be made plain to them that the room is distinctly a separate department, having no connection with their ordinary work.

Having now provided for our testing department, and established its relation to the purchasing of supplies and to the employees of the repair-shop, what machines and instruments shall we need in its equipment?

A high and low reading direct current volt-meter, one having a double scale reading from 1 to 750, and from 1 to 15.

A direct current ammeter reading from 1 to 100.

A low reading ammeter would be very convenient many times, but is not absolutely necessary.

A 50,000 ohm magneto bell, an alternating current volt-meter, and some handy testing set will make an outfit of instruments with which we can do all the testing required.

If the alternating current is not within reach of the car-house, we must procure a small dynamo and produce it ourselves. A very small machine, say 2 H. P., would be sufficient for all the needs of the testing department. If this machine is designed for about 100 volts it would be most convenient for our use. With a few small transformers wound for 2,000 volts primary, and for either 50 or 100 volts secondary, we are prepared to furnish any voltage within a range of from 5 volts to 10,000 volts.

The man who has this part of the work in charge can very easily and cheaply arrange the details of installation of the wiring, etc. He can also make some resistance coils and many other pieces of apparatus which will greatly facilitate the quick testing of whatever may be sent to this department.

What shall we test? First, everything that goes into the repair-shop. By doing so we shall be sure of keeping all material up to the standard, which means an absolute guarantee against breakdowns caused by poor material. In this way we raise the standard of workmanship.

Second, all supplies which go to the foreman of the car-houses. In connection with this matter we are of the opinion that in the testing-room should be decided the manner of treating brushes, the length of time they should be used before being removed from the motor, the manner in which they should then be cared for, and their final disposition; also the proper attention to be given to the trolley poles, the length of time they ought to remain in service, their condition when removed, and many other similar questions should not be left to work out their own solution, or be dependent upon the feelings or judgment of the various employees and workmen, but should be definitely determined and decided in our testing department.

Many may be of the opinoin that we are carrying system beyond necessary limits in thus definitely and positively arranging these details; but why should we allow several different men to use material in whatever manner they may individually see fit, to treat brushes as their fancy may dictate, to regulate the tension of trolley poles in accordance

with their own feeling at the time rather than by any fixed standard, and various other matters which might be mentioned along these lines.

Third, all finished material, such as armature-coils, insulation for controllers, commutators and brush-holders. We do not necessarily need to test every piece, but enough to satisfy ourselves that the general order of work is kept up to the standard.

Fourth, all armatures, fields, commutators and controllers as they are being made or repaired. One illustration will be sufficient to show how the testing may be carried on in this branch of work:

An armature is wound and ready to be connected to the commutator. With a small wire we connect all of the top leads together; with the bottom leads each separate from the other. With a magneto or testing set we find the insulation of the complete armature is not right. First, we cut the small connecting wire on the top leads in several places, and then by testing each of these parts we locate that portion of the armature which is bad; then, by removing the wire we will test each coil separately until we find the weak one. Next, by the use of our transformers we obtain three or four thousand volts, which we apply to this one coil. If it stands the test we may allow it to go through; and if not, it can be replaced. If we should find that the trouble extended to a large portion of the armature and indicated moisture in the coils, we may, by the use of this same transformer, obtain twenty-five or thirty volts; and by connecting the armature to the commutator, with the exception of one end of one coil, then connecting one side of the twenty-five-volt circuit to this end and the other side of the circuit to the commutator bar left vacant, we may apply the current for the purpose of drying the armature. By this method we have this advantage, that the heat will be generated in the core and the armature will dry from the inside instead of from the outside.

With similar tests on all finished parts sent out from our repair-shop we have almost wholly removed the chances of failure in service and have unquestionably added to the length of life which may reasonably be expected from our equipment.

By running a few wires from our testing-room to that part of the shop where the cars are brought in for repairs, we are able to reach every part of the equipment in a quick and thorough manner, and it is probable that if a few tests are made on every car that comes into the shop many troubles will be located before they have sufficiently developed to become serious. Hence, the time required to make tests will add nothing to the pay roll, while the benefits derived may be many. All cars should be brought to the repair-shops and thoroughly overhauled and inspected at least twice a year.

In determining what shall be the standard of the work in the different branches of the shop, of the finished material, and of the cars

in service, I do not believe there can be any fixed scale; but that, as we proceed with our testing and inspection, we shall gradually raise the standard of our work, and it will only be a short time after adopting a thorough method of doing the work before many of the daily perplexities now encountered will have been eliminated.

Respectfully submitted,

FREDERICK B. PERKINS.

The President—Gentlemen, you have heard the paper; it is now open for discussion.

Mr. Chapman, Chicago—In view of the lateness of the hour, I move that this paper be received, with thanks, and ordered printed in the minutes without discussion. Carried.

ANNOUNCEMENT OF ENTERTAINMENT.

The President—I would announce that special cars will leave the Hotel Brunswick at 1:30 o'clock sharp, and the train will leave at 2 o'clock for the excursion to Plymouth. We will return to the city about 6:15, which will give you ample time to prepare for the banquet, which will take place at 8 o'clock.

I wish to call attention to the paper to be read to-morrow morning by Mr. Conant. It is an able paper, and will be illustrated by diagrams; and I hope you will all attend the meeting promptly.

There will be a report of the Committee on Standard Rules for Conductors and Motormen. This is an important subject, and is worthy of considerable discussion.

Mr. Bean, St. Joseph—I move that we adjourn until 9:30 o'clock to-morrow morning. Carried.

FRIDAY'S SESSION.

President Lang called the meeting to order at 10:40 a. m.

The President—The last paper on the programme, which is to be read this morning, is entitled "Cost of Electric Power for Street Railways at Switchboard, both Steam and Water," by Mr. R. W. Conant, Electrical Engineer, Boston Elevated Railway Company, Boston, Mass.

REPORT OF THE COMMITTEE ON "COST OF ELECTRIC POWER FOR STREET RAILWAYS AT SWITCH-BOARD, BOTH STEAM AND WATER."

Mr. Conant read the report, as follows:

The American Street Railway Association—

Gentlemen: It is my privilege to be able to communicate to you facts and figures bearing on the operation of forty-four power stations located at the important street railway centers throughout the country.

These figures cover for the most part the operation of the stations during the past year, and were obtained through the kindness of members of this Association, as well as from experience on the roads in Boston.

The aggregate capacity of power stations represented is 98,387 K. W., or 131,800 electrical H. P.

The total cost of operation for the production of power alone from these stations during the past year has been $1,825,000, and if the power had been produced by all at as low a cost as it was in a number of the more economical stations the saving for the year would have amounted to $443,300.

It is the chief purpose of this paper to explain the If and to obtain some idea of its size.

In what has been published on this subject there are a great variety of opinions as to what should be included in the cost of power, and also as to whether the basis of comparison should be the car-mile or K. W. hour, this latter being due to the fact that up to within a few years there has been no reliable instrument adopted by street railways for the measuring of their output.

The car-mile basis is not a fixed standard. A car-mile up hill takes a great deal of power, while a car-mile down hill should take none, and may be made a source of power.

In the analysis of costs of operation of power stations of various sizes and types, it is first necessary to adopt a standard for the unit of power. We have seen that the car-mile is unreliable. Recording watt-meters are at present constructed which will measure the output in K. W. hours. They can be made to give results which are accurate within a very few per cent. This statement is abundantly verified by actual experience and is gradually becoming universally recognized. It is no doubt difficult for one who has been accustomed to figure cost of power production on a car-mile basis to reconcile himself to the K. W. hour. It should, however, be very easy for the steam engineer who is accustomed to deal with H. P., since the K. W. hour equals 1.34 electrical H. P. hours.

It was evidently the idea of your Executive Committee in limiting the title of this paper to cost at the switch-board to abolish the car-

mile and adopt the K. W. hour as the unit of power. And in comparing the costs from the various stations I shall use this unit. For the benefit of those who are accustomed to considering the costs per car-mile, it will be interesting to know that on many roads a car-mile takes just about 1 K. W. hour. This is not true where grades and equipments are extremely heavy. In such cases two or three times this amount may be required.

In the costs of power, whether it is produced by steam or water, should be included the fixed charges, as well as the cost of operation. Under fixed charges are interest, depreciation, insurance and taxes on the capital invested in the land, buildings and machinery of the power station.

Under operating expenses are fuel, labor, supplies, repairs, superintendence and general expense.

In both the fixed charges and operating expenses the component items vary between widely different limits, and it becomes impossible to construct a law that will predict the cost under all circumstances.

On the other hand, for one who has had experience it is compartively easy to predict what the power ought to cost under a given set of conditions. What it will cost must, of course, depend on management as well.

In view of the variety of circumstances governing these costs, I have deemed it advisable to establish, for purposes of comparison, a standard plant whose conditions are fixed.

It is not my intention to imply that the performance or equipment of this station, which I shall employ as a standard, is ideal or could not be bettered, but rather to assume equipment and performance based on facts obtained from stations in actual commercial operation during a long period of time.

As this station is described, its performance may seem to border on the ideal, and there is no question but that its performance is consequent on favorable circumstances, very nearly, we may say, test conditions. It is, however, in my opinion, best to err on this side rather than on the other in establishing a station for comparison.

I shall assume the station to be located on the water front, the exact spot is unimportant, but since this Association has chosen Boston as its meeting place we can consistently locate the station here as well. I have fixed the capacity at 3600 K. W. The building erected on firm ground, requiring but little piling or filling; building and chimney of brick.

For equipment, three cross compound condensing engines, cylinders 28-in. and 56-in. by 5-ft. stroke. Speed eighty revolutions per minute, 150 pounds steam pressure, 3-1200 K. W. direct connected generators, six water-tube safety boilers, 500 H. P. each. Economizers and exhaust feed water heaters, electrically driven feed pumps and

coal handling apparatus. Such a station would cost to install as follows:

CAPITAL INVESTMENT.

Building, foundations for engines and boilers, chimney and coal handling apparatus	$120,000
Engines and condensers, heaters, separators and piping	91,800
Feed pumps and economizers	18,000
Boilers and flue connections, complete	61,000
Generators and switch-board, complete	73,800
Land and docking facilities	17,000
Engineering and sundries	5,000
Total	$386,600

or about $107 per K. W. capacity.

To obtain the figure for fixed charges I assume interest at 6 per cent; insurance and taxes, 3 per cent; depreciation, 2 per cent—total, 11 per cent, which makes an annual fixed charge of $42,526.

I shall assume that this station produces 10,500,000 K. W. hours per annum, and dividing the annual charge by this figure gives four cents per K. W. hour for the fixed charges. The depreciation is not intended to cover repairs, which will be included under operating expenses. The 2 per cent assumed for depreciation is to establish a sinking fund against the time when the station will have to be entirely replaced by one of more modern and economical design. Time of replacement is taken at fifty years. A few years ago the time of replacement should have been assumed much shorter, owing to the imperfect design of power station apparatus then existing. But with the present advanced state of the art improvements cannot be expected to develop as rapidly.

Before arriving at the cost to produce power from this station it will be necessary to obtain the operating expenses.

In making comparisons between stations of different sizes and types the cost of labor is the most perplexing item.

Some stations operate with two shifts, others with three. Some have engineers paid at different rates, and men who appear on the records of some are in a capacity which in others is absent or replaced by men of another class and rate of pay. I therefore give the following method of analysis of the labor item which gives satisfactory results when applied to station operation.

I can illustrate the method, and at the same time derive the operating expenses, by applying it to our standard station. It is assumed that this station operates with three shifts of men, the duration of each shift being eight hours. This makes the shift hours per day 24, or 8,760 for the year. The same number of shift hours would,

of course, be obtained by two shifts of twelve hours each, as is the case with some stations. For the three-shift station, the first two probably would have the full complement of men, while the third would not, as the station might be shut down on that shift. But as there is considerable inspection, cleaning and overhauling, this shift requires almost as many men, though their rate of pay may be less. The highest rates of pay would be on the shift of the heaviest load. The crew to operate the standard plant would be about as follows: Two engineers, one oiler, one helper, two firemen, and one coal passer, a total of seven men per shift.

The average rate of pay per man is taken at twenty-seven cents per hour. This would be calculated from an actual station by dividing the total amount paid for wages, including chief engineer's salary, by the product of the number of men operating with the hours each has worked. The number of men per shift for this station being seven, I will divide this figure by 3.6, which is the figure expressing the capacity in 1000 K. W. units. This division gives 1.94 as the number of men per shift per 1000 K. W. capacity. This figure will vary with the type and size of station, as we shall see later. The fractional part of the man, of course, only appears in figuring.

Multiplying the 1.94 by the rate of pay, twenty-seven cents, gives fifty-two cents as the cost of labor per hour per 1000 K. W. capacity. This multiplied by 3.6, the number of 1000 K. W. capacity, gives $1.87 as the total cost of labor required to operate the station per hour.

It will further aid in the analysis of the labor item to introduce the load factor. As this term is sometimes employed in a different sense from that used in this paper, I shall define it to be that per cent which when multiplied by the capacity of the station in K. W. and by the shift hours for the period gives the K. W. hours output for the time considered. I take as the load factor for this station 33.3 per cent, average for the year. You may remember that in the consideration of the fixed charges I gave as the K. W. hours per year 10,500,000, which is 33.3 per cent of 3600 K. W. multiplied by 8,760, the shift hours per annum.

It has been shown above that $1.87 is the average cost of labor to operate the station for one hour, and if we obtain the average K. W. during the hour, which is K. W. hours for that period, a simple division will give the figure for the cost of labor per K. W. hour. The load factor gives the means of obtaining the K. W. hours, and by multiplying 3.6 by 1000 and 33.3 per cent gives 1200 as the average K. W. for the hour, or K. W. hours for that period. Dividing $1.87, cost of labor to operate the station per hour, by 1200, gives .157 cent as the cost of labor per K. W. hour. But 3.6, the figure representing the capacity, was used as a multiplier in obtaining both the cost of labor, $1.87, and 1200 K. W. hours. It therefore disappears in the

division and the expression for the cost of labor per K. W. hour is made independent of the capacity of the station to that extent. The rule then for obtaining the cost of labor per K. W. hour for any station is to multiply the rate of pay of the men by the number of men per 1000 K. W. capacity and divide by the product of the load factor and 1000.

The use of this method will be illustrated if we compare the cost of labor per K. W. hour in the first two columns of table No. 1. It is .157 for the standard and .56 of a cent for station No. 1. It is rather difficult to account for this great increase until we notice that the men per 1000 K. W. is 4.7, as against 1.94. The rate of pay and load factor also enter, as I shall show later.

I have constructed a diagram which gives the results of this expression for cost of labor for all usual rates of pay, load factors and men per 1000 K. W. This diagram is based on a rate of twenty-seven cents per hour, and there is also given a reduction table which gives the per cent to be added or substracted for other rates than this. To illustrate its use, suppose we have a station whose equipment requires five men per shift per 1000 K. W. capacity. During a month of high output it might operate at a 30 per cent load factor. On the diagram following 5 up to 30 gives cost of labor at .45 of a cent per K. W. hour. In a lighter month the station might operate at a 15 per cent load factor. Following 5 up to 15 gives .9 of a cent, or twice as much for labor per K. W. hour.

To further illustrate the use of this diagram, let us consider that the equipment of our standard station is cut into so many units that it required 3.7 men instead of 1.94. Price of labor and load factor being twenty-seven cents and 33.3 per cent, respectively; 3.7 followed on the diagram up to 33.3 per cent gives .3 of a cent, as against .157 of a cent for standard.

The cost of fuel is the next item to be considered in the operating expenses of the standard station. Considering coal as the fuel used, its cost per K. W. hour depends on the price per ton and on the efficiency of the station, which is best expressed in pounds of coal consumption per K. W. hour. The coal for standard station I have assumed to be clear bituminous, costing three dollars per short ton delivered.

As to efficiency, I am able to quote from tests in which I was personally engaged on a station of the same size and similar equipment. The duration of the test was forty-five hours, made under actual conditions of railroad service during the day, and at night the load was kept on the station by means of a water rheostat. I will say here, however, that the test on the steady night load did not show any great gain in efficiency, due to the fact that the day load of the station was steadied by feeding in with others. The average efficiency of transformation

TABLE NO. 1.

SHOWING COST OF OPERATION OF POWER STATIONS.

NO. OF STATION.		S.	1	2	3	4	5	6	S.	1	2	3	4	5	6	S.	1	2	3	4	5	6
CAPACITY IN 1000 K. W.		3.6	.6	2	1.6	12.68	2.38	.744	3.6	.6	2	1.6	12.68	2.38	.744	3.6	.6	2	1.6	12.68	2 38	.744
TYPE.	Units E.	3	3	2	2	8	2	4	3	3	2	2	8	2	4	3	3	2	2	8	2	4
	Units G.	3	3	2	2	8	7	12	3	3	2	2	8	7	12	3	3	2	2	8	7	12
	Units E. Per 1000 K.W.	.83	5	1	1.25	63	.84	5.4	.83	5	1	1.25	.63	.84	5.4	.83	5	1	1.25	.63	84	5.4
	Units G. Per 1000 K.W.	.83	5	1	1.25	.63	2.94	16.2	.83	5	1	1.25	.63	2.94	16.2	.83	5	1	1.25	.63	2.94	16.2
	B. D. C.	D.C.	D.C.	D.C.	D.C.	D.C.	B.	B.	D.C.	D.C.	D.C.	D.C.	D.C.	B.	B.	D.C.	D.C	D.C.	D.C.	D.C.	B.	B.
	S. C. T.	C.	C.	C.	C.	C.T.	T.	S.	C.	C.	C.	C.	C.T.	T.	S.	C.	C.	C.	C.	C.T.	T.	S.
	N. or C.	C.	C.	C.	C.	C.C.	C.	N.	C.	C.	C.	C.	C.C.	C.	N.	C.	C.	C.	C.	C.C.	C.	N.
PERIOD.	DAYS.	365.	365	343	365. 1897	365.	365.	365.	31.	31.	31. Janu	31. ary,	31 1897	31.	31	30.	30. Sept	30. emb	30 er, 1	30. 897	30.	30.
LOAD FACTOR	PER CENT.	33⅓	22.3	33.6	46.4	34.8	52.2	47	33⅓	30	50.6	58.6	46.4	64	48.4	33⅓	17.7	28	43.2	27 6	42 6	43
	PER CENT OF S.		67	101	139.5	104	157	141		90	152	176	140	192	145.5		53.2	84	130	83	128	129
LABOR. Cost in Cents.	SHIFTS.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	DURATION.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	SHIFT—HOURS.	8760	8760	8232	8760	8760	8760	8760	744	744	744	744	744	744	744	720	720	720	720	720	720	720
	MEN PER 1000 K. W.	1 94	4 67	2 91	3.36	1.9	4.79	5.95	1.94	4 66	2.95	3 24	1.93	4.93	6.36	1.94	4 96	3	3.8	1.77	4.5	6
	RATE—PAY.	27	26.8	25 7	25.8	28.6	26 6	25.3	27.	26.5	26.2	25	29.	25 8	25.6	27.	25.	25.6	24.4	28.4	27.6	24 2
	PER K. W. HOUR.	.157	.56	.223	.187	.156	.243	.321	.157	.41	153	.138	.121	.198	.336	.157	.705	.273	.215	.182	.292	338
	PER CENT. TOTAL OP.	27.	46.7	32.5	28.4	22.6	28.7	29.1	27.	41.	27.2	23.	18.3	26.8	27.7	27.	51.4	40.6	32.5	25.9	31.8	31 7
	PER CENT. S.		356	142	119	99.1	154	204		261	97.4	88	77	127	214		448	174	137	116	186	215

TABLE NO. 1—CONTINUED.

NO. OF STATION.		S	1	2	3	4	5	6	S	1	2	3	4	5	6	S	1	2	3	4	5	6
FUEL. Cost in Cents.	Lbs. per K. W. hr.	2.2	3.18	2.48	2.61	2.86	3.24	4.13	2.2	3.07	2.36	2.65	2.74	3.19	4.74	2.2	3 3	2.34	2.48	2.84	3.6	4.05
	Price per Short Ton, $	3	2.6	2.62	2.6	2.72	2 6	2.9	3	2.75	2.65	2.54	2 88	2.71	3.08	3	2.48	2.56	2.53	2.43	2.56	2.44
	KIND, A OR B.	B.	.3A .7B	.25A .75B	.3A .7B	B	.2A .8B	B	B	3A .7B	.25A .75B	.3A .7B	B	.2A .8B	B	B	3A .7B	.25A .75B	.3A .7B	B.	.2A .8B	B
	PER K. W. HOUR.	.33	.414	325	.340	.389	.42	.599	.33	.421	.313	.337	.395	.430	.729	.33	.409	299	.314	.345	.423	.494
	PER CENT. TOTAL OP.	57.	34.5	47.4	51.6	55.2	49.7	54.3	57.	42.	55.6	56 4	59.9	58.4	60 1	57.	29.8	44.3	47.5	48.8	46.1	46.4
	PER CENT. S.		125.5	98.5	103	117.5	127	182		127.5	94.5	102	120	1.30	220		124	91	95	104	128	140.5
Repairs, Supplies, and Supt. and Gen. Expense.	PER K. W. HOUR.	.093	.225	.138	.132	.159	.182	.182	.093	.172	.0975	.123	.144	.109	.147	.093	.258	102	.133	.176	.203	.233
	PER CENT. TOTAL OP.	16.	18.8	20.1	20.	22 6	21.6	16.5	16.	17.	17.2	20.6	21.81	14.8	12.2	16.	18.8	15.1	20.	25.1	22.1	21.9
	PER CENT. S.		242	148	142	171	196	196		185	105	132	155	117	158		278	110	143	189	218	250
Total Oper. Cents.	PER K. W. HOUR.	.58	1.198	.686	659	.704	.845	1.102	.58	1.003	.563	.598	.66	.737	1.21⁰	.58	1.372	674	.662	.703	.918	1.065
	PER CENT. S.		205	118	114	122	146	190		172.5	97.	103	114	127	208		236	116	114.5	121	157	184
Fixed Charges	PER K. W. HOUR.	405							405							.405						
	PER CENT. TOTAL OP.	70							70							70						
	Per Cent. S.																					
	GRAND TOTAL	.985																				

I. H. P. to E. H. P. at the switch-board was 90 per cent. The steam consumption of the engines was 14.5 pounds per I. H. P. hour. This record on a later test has been lowered. The boiler evaporation was 9.4 pounds of water per pound of coal from actual conditions. The coal used was New River bituminous. The economy of the station, represented by the coal consumption in pounds per K. W. hour was 2.3. I have assumed 2.2 for this figure for the standard station.

Reducing price per ton to price per pound and multiplying by 2.2 gives .33 of a cent as the cost of coal per K. W. hour. This appears in table No. 1 under cost of fuel. As an illustration of what the cost would have been had the engines required more steam, say 26.6 pounds per I. H. P. hour, as might be the case with a non-condensing engine. Referring to the fuel diagram and considering the electrical efficiency, boiler evaporation and price of coal to remain the same, 26.6 to 9.4 pounds of water per pound of coal gives 3.8 pounds of coal per K. W. hour. Following this line down to horizontal three dollar coal line and vertically upwards from this point to cost of fuel in cents per K. W. hour, we obtain .57 of a cent, were the efficiency of transformation 100 per cent, but since it is assumed to be but 90 per cent, 11 per cent has to be added to this cost, as shown in the reduction table. This gives the cost of coal per K. W. hour .63 of a cent, as against .33 of a cent for the condensing engine.

There remains to be included in the operating expenses for this station, water, oil, small supplies, repairs, superintendence and general expense, which I have estimated at .093 of a cent per K. W. hour. The total operating expense foots up to .58 of a cent, which, added to the fixed charge of .4 of a cent, makes the total cost power from standard .98 of a cent, or very nearly 1 cent per K. W. hour.

Before comparing the costs from the various steam plants I will review briefly the circumstances governing the production of power by water.

The application of water power to street railways has the following points of advantage: In plants operated under any but very low heads the generating machinery may be installed at a less cost than for steam. Also the fuel expense disappears as well as a portion of the cost of repairs. A part of the labor expense will be saved, inasmuch as no engineers, firemen or coal handlers are required.

The main disadvantage in the application of water power to street railway operation lies in the fact that generally railroad power stations are quite distant from waterfalls, and that it is very expensive to transmit the electrical energy to any considerable distance; the distance of transmission being hundreds of miles for the majority of street railways. That it may be made more profitable to employ water power when its location is nearby the road and the price of coal is high also, there can be no doubt.

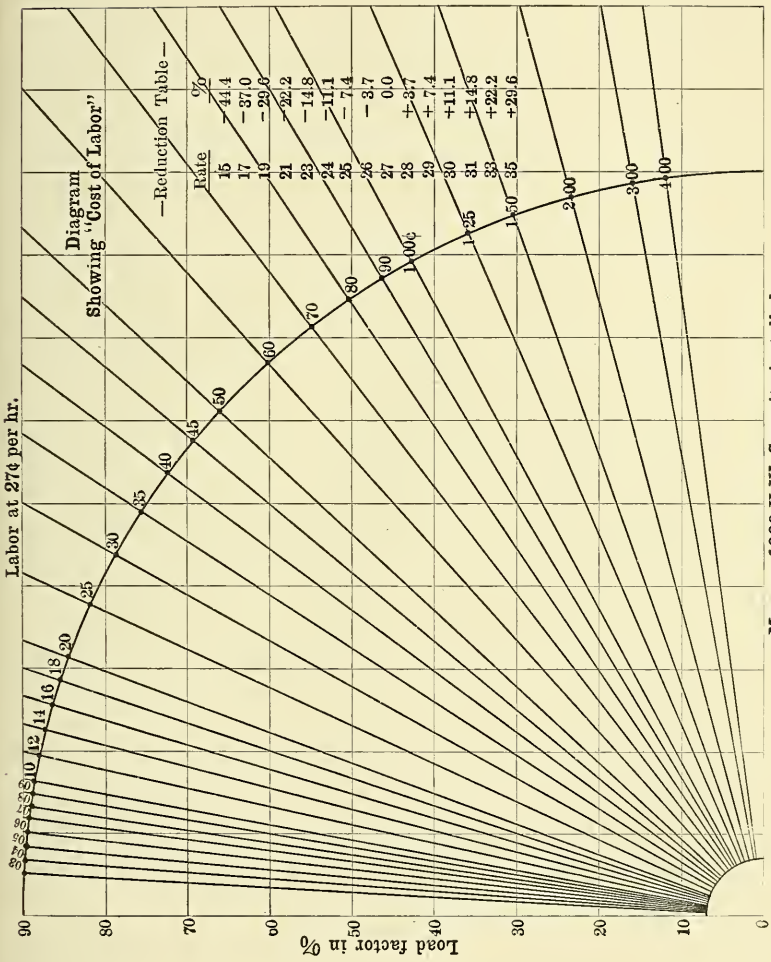


Diagram
Showing "Cost of Labor"
Labor at 27¢ per hr.
—Reduction Table—
Rate
%
15 — 44.4
17 — 37.0
19 — 29.6
21 — 22.2
23 — 14.8
24 — 11.1
25 — 7.4
26 — 3.7
27 0.0
28 + 3.7
29 + 7.4
30 +11.1
31 +14.8
33 +22.2
35 +29.6
Load factor in %
Men per 1000 K.W. Capacity installed.

The cost to produce power from water is often compared with the cost to produce from coal on the basis of continuous operation for twenty-four hours a day. For street railway service this method gives a false impression, since it implies that the machinery is working at its full capacity for 8760 hours per annum, or 100 per cent load factor; as a matter of fact, for street railway service a load factor of 33 per cent is high.

To look at this from another point of view, the demand for power for street railways cannot be increased at will, as it may be in a manufacturing concern. In the latter, if it is found advisable to run night and day at full capacity, instead of ten hours, there is produced a correspondingly greater amount of the product, be it flour, steel rails or carbide of calcium, and this output is produced at a correspondingly decreased cost per unit.

For street railway service, on the other hand, there has to be installed sufficient generating machinery to take the peak of the load.

This is usually three times the average and is only of a few hours duration each day. If it were necessary or profitable to use this full capacity continuously for other industries, it would be possible to do this with very little increase of labor, no increase of fixed charges and the additional expense of producing the greater output would be merely the coal and a slight increase of supplies and repairs. This combination is the feature of the Niagara Falls work.

When the expense of transmission shall have been decreased by the successful employment of higher voltage, it will then become a problem as to whether it will not be profitable to produce power from a steam plant located at a coal mine, coal costing in this case but eighty cents a ton. This would bring the cost of fuel down to .12 of a cent per K. W. hour, as against .33 of a cent for standard plant. Further, this expense would only continue for the comparatively small number of hours that the plant would have to be operated for street railway service. This might be better economy than to pay the fixed charges that would accrue from the expensive development of water powers at possibly much greater distances.

It is to be noticed in this connection that the cost of installing the steam station would be considerably less when located at the coal mine, since it would then be unnecessary to equip with the most economical and expensive machines.

Water power produced in various parts of the country varies greatly in its cost. It is reported that the electrical energy so produced costs from fourteen dollars to thirty-two dollars per annum per K. W. continuous output. This expense is largely made up of fixed charges, which increase rapidly as the expense of making the necessary improvements is greater. The standard steam plant produces power with three dollar coal for twenty-nine dollars and with

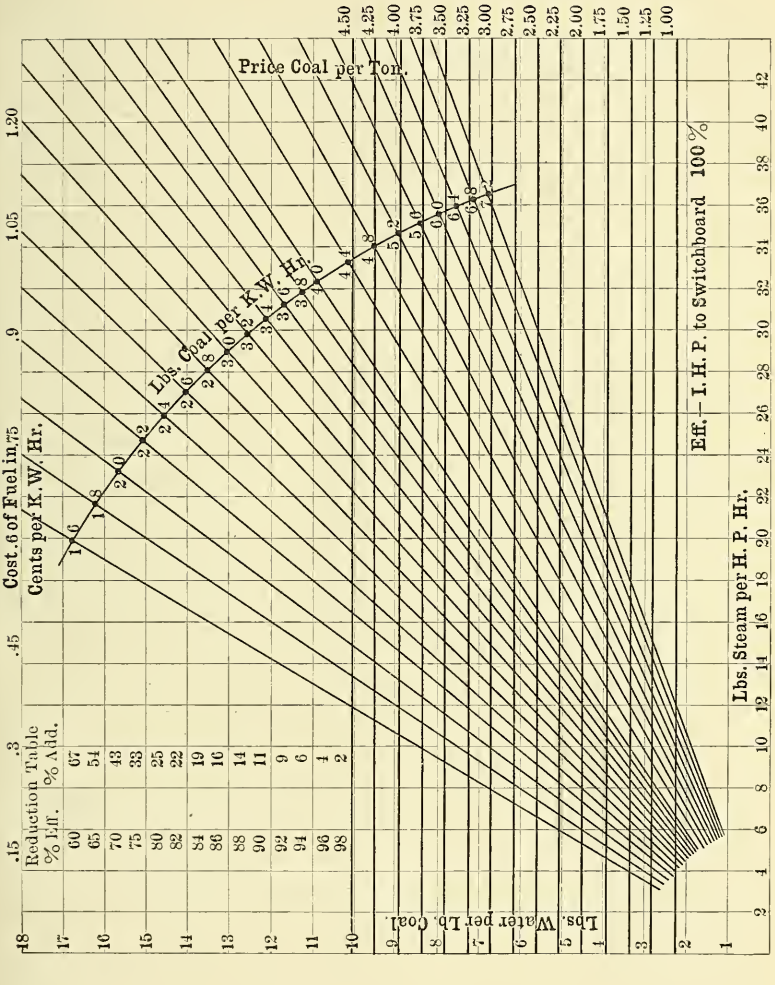

Price Coal per Ton.
Cost of Fuel in Cents per K. W. Hr.
Lbs. Coal per K. W. Hr.
Lbs. Water per Lb. Coal.
Lbs. Steam per H. P. Hr.
Eff.—I. H. P. to Switchboard 100 %
Reduction Table
% Lin. % Add.
60 67
65 54
70 43
75 33
80 25
82 22
84 19
86 16
88 14
90 11
92 9
94 6
96 4
98 2

TABLE NO. 2.

DATA ON "OPERATION OF POWER STATIONS."

NO. OF STATION.		S	10	11	12	13	14	15	16	17	18	19	23	25	26	28	29	30	31	32	33	34	35	37	40	42	43	44	45	47	48
CAPACITY IN 1000 K. W.		3.6	.4	1.4	1.0	2.6	1.6	1.6	1.6	.8	.4	3.4	.6	4.0	.8	1.4	1.9	1.7	.9	5.3	1.5	2.0	1.2	1.5	9.2	1.8	3.3	6.0	1 0	.75	6
TYPE.	UNITS, E.	3	2	5	3	4	4	10	8	2	2	6	3	10	7	4	5	5	3	5	4	4	1	3	6	3	5	6	4	4	2
	UNITS, G.	3	2	8	7	4	4	16	8	4	3	6	3	19	12	8	5	5	3	30	12	4	1	11	6	6	10	12	7	4	2
	B. OR D. C.	D.C.	D.C.	B.	B.	D.C.	B. D.C.	B.	B.	B.	B.	D.C.	B.	B.	B.	B.	B.	B.	B.	B.	B. D.C.	D.C.	D.C.	B.	D.C.	B.	B. D.C.	B.	B. D.C.	D.C.	D C.
	S. C. T.	C.	S.	S.	C.	S.	S.C.	S.C.	C.	C.	S.		C.	S.	S.	S.	C.	C.	C.	C.	C.	C.	C.	C.S.	C.	C.	C.	C.	C.	C.	C.
	N. OR C.	C.	N.	N.	C.	N.	N.C.	N.C.	C.	C.	N.		C.	N.	N.	C.	C.	C.	C.	C.	C.	C.	C.	C.N.	C.	N.	C.	C.	C.	C.	C.
PERIOD, DAYS.		365	1	365	365	365	365	183	365	365	365	31	183	365	365	31	365	365	365	365	365	183	365	151	365	365	365	365	30	183	365
LOAD FACTOR, PER CENT.		33⅓	24	23	23	42	19	41	33	24			16	33	19	23	27	23	32	31	16	57	37	11	36	45	15	30	28	20	35
TAKEN FROM CAR MILES.				X						X			X																X	X	

TABLE NO. 2—CONTINUED.

	NO. OF STATION.	S	10	11	12	13	14	15	16	17	18	19	23	25	26	28	29	30	31	32	33	34	35	37	40	42	43	44	45	47	48
LABOR.	SHIFTS.	3		2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	3	2	2	2
	DURATION.	8		12	12	12	12	12	8	12	12	12	12	12	12	12	10	10	10	12	12	12	12	12	8	8	12	8	10	12	10
	SHIFT, HOURS.	8760		8760	8760	8760	8760	4380	8760	8760	8760	744	4380	8760	8760	744	7300	7300	7300	8760	8760	4392	8760	3624	8760	8760	8760	8760	600	4380	7300
	MEN PER 1000 K. W.	1.94	7.5	3.7	3.7	3.0	1.87	6.3	3.7	3.7	3.7	3.0	3.3			5.0	3.2	3.0	4.5	3.5	5.0	5.0	2.1	8.0	2.7	5.0	3.7	3 3	3.0	8.0	6 7
	RATE OF PAY.	27	18	20	20	22	15	16	20	18	12	17	25			17	21	21	21	20	20	20	26	16	23	26	16	24	15	12	15
	CTS. PER K. W. HR.	157		.32	.31	.16		.25	.23	.28			.51			.37	.25	.27	.29	23	.62	.18	.15	1.1	.17	.29	.39	.26	.16	.41	.29
FUEL.	LBS. PER K. W. HOUR.	2.2		6.7	4.3	6.5		6.5	5	5			6	5.6	6.8	7	3.9	3.3	4.4	3.5	4.3	5.3	4.7	7.3	3	5.7	3.7	3.5	4.7	5.1	3.3
	PRICE ($) PER TON	3	2	2.24	2.93	1.44		2.10	3.30	1.43	.75	.60	3.44	1.05	1.15	1.63	2.80	3	2.84	3	3.08	1.0	1.24	1.75	1.60	1.60	2.70	1.60	1.90	2.12	2.75
	KIND A. OR B.	B.	.5A. .5B.	A.	B.	B.		B.	B.	B.	B.		B.					B.	B.	B.	B.	B.	B.	.5A. .5B.	A.	A.	.6B. .4A.	A.	B.	.5A. .5B.	
	CTS. PER K. W. HOUR	.33		.75	.63	.47		.68	.83	.36			1.03	.29	.39	.57	.55	.49	.62	.52	.66	.27	.29	.63	.24	.45	.50	.28	.45	.54	.45
	GEN. EX. PER K. W. HR.	.093		.33	.11	.09		.14	.09	.06			.16			.08	.23	.15	.19	.09	.22	.12	.04	.12	.11	.18	.14	.15	.05	.21	.28
	TOTAL OP. PER K.W. HR.	.58	1.5	1.4	1.05	.72		1.07	1.15	.70		.68	1.7	.56	1.2	1.02	1.03	.91	1.1	.84	1.5	.57	.48	1.85	.52	.92	1.03	.69	.66	1.16	1.02
	FIXED CHARGES.	.405			.44	.24		24					.1																		

eighty-cent coal for twenty-two dollars per K. W. per annum, which compare very favorably with the above for water power.

A disadvantage occurring in the use of water power is that in some cases, on account of certain periods of low water, an auxiliary steam plant has to be kept in reserve, which is, of course, an additional expense.

There can be no general rule given that will determine whether it is more advantageous to use water or steam power. Each case must be figured by a competent engineer, and decided on its merits.

The great majority of street railways being operated by steam, I shall not dwell longer on water power, as there is still considerable ground to be covered in the consideration of the steam stations.

I have compiled and classified the data on representative ones throughout the country. Tables No. 1 and No. 2 give the results.

The general arrangement of the tables is as follows: Each vertical column contains the data for a different station during a stated period. Each station is represented by a number which appears at the head of the column; only a portion of the table is exhibited to you on the large diagram, for obvious reasons. but I will describe the different items as they appear in the completed table. The first column is headed S., for Standard Station. Following down the column first comes the capacity expressed in multiples of 1000 K. W., 3.6 meaning 3600 K. W. The number of units of engines, 3; ditto for generators, 3; number of units engine per 1000 K. W. capacity is .83, obtained by dividing 3 by 3.6; ditto for generators, .83. The next line under Type is a description as to whether the engines are belted or directly connected to the generators. B. for the former and D. C. for the latter. The two lines marked S. C. T. and N. or C. refer to engines, Simple, Compound or Triple, Non-condensing or Condensing, as in standard C is Compound Condensing.

The period during which the averages are taken is given in days. Load factor is in per cent. Inserted in the proper place under costs are the per cent S. and per cent total, which figures represent the percents the items bear to the corresponding ones for Standard, and to the total operating expense, respectively.

The number of shifts, duration in hours and shift hours, together with the rate of pay of men in cents per hour, and number of men per shift per 1000 K. W. capacity complete the data necessary for the analysis of the cost of labor. Costs are all expressed in cents per K. W. hour. Opposite Fuel, pounds of coal per K. W. hour, and price, which is in dollars per short ton, give the necessary figures to analyze the cost of fuel per K. W. hour. Kind, A. or B., refers to anthracite or bituminous.

Repairs, supplies, other than coal, that is, water, oil, waste, lamps and miscellaneous, as well as superintendence and general expenses, are treated as one item, hereafter called general expense.

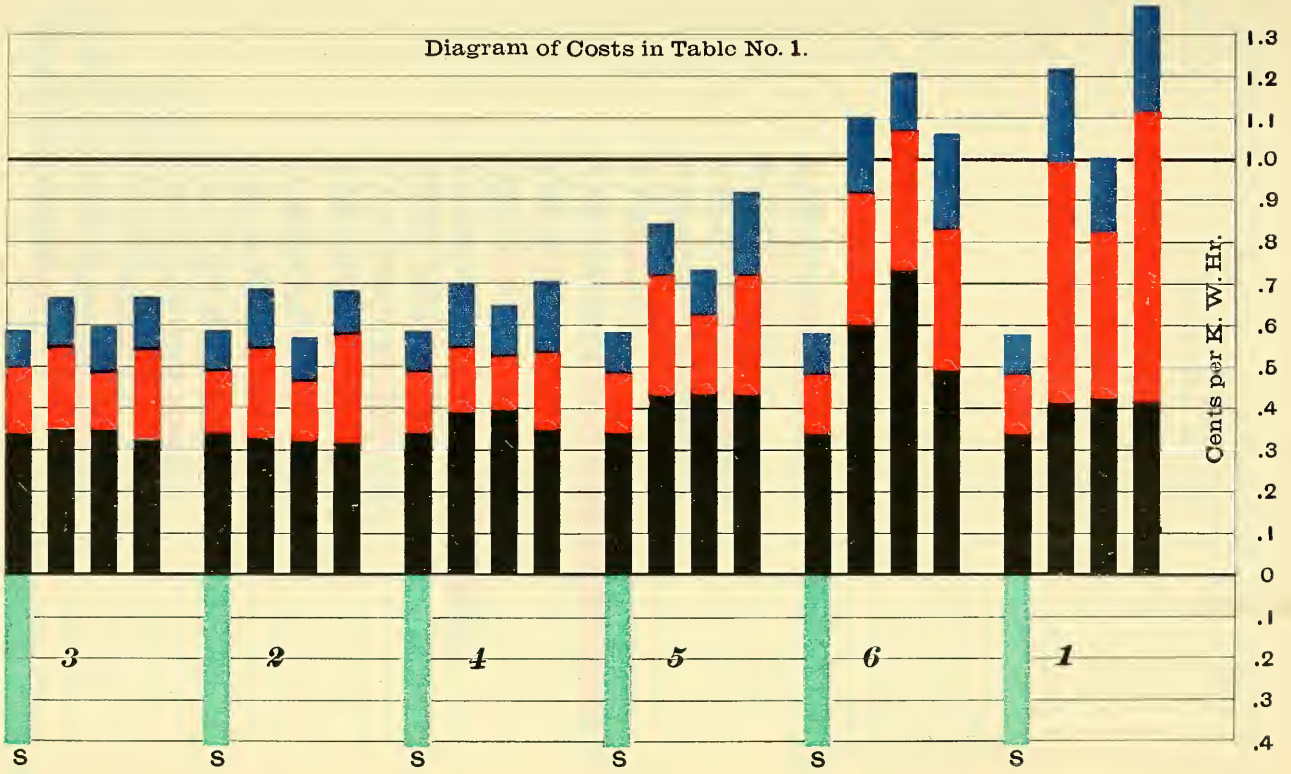


Diagram of Costs in Table No. 1.
Cents per K. W. Hr.
1.3
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
.1
.2
.3
.4
3
2
4
5
6
1
S
S
S
S
S
S

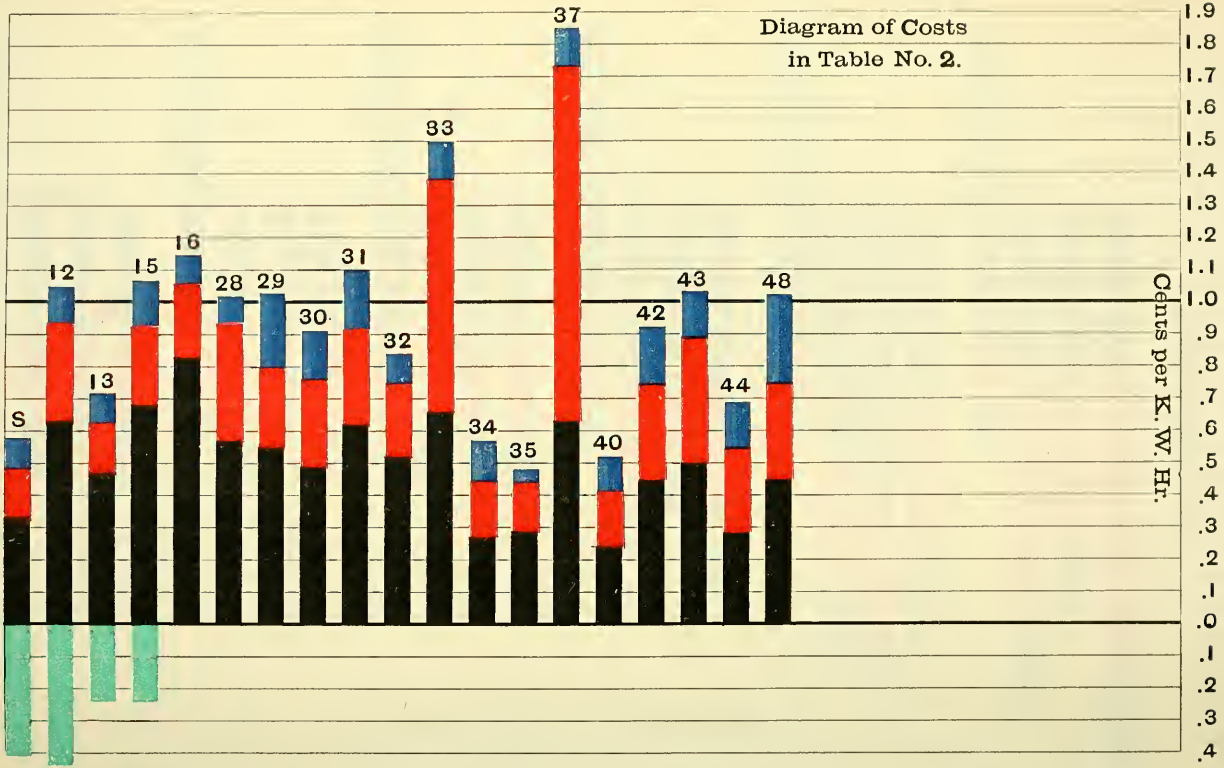


Diagram of Costs
in Table No. 2.
8
12
13
15
16
28
29
30
31
32
33
34
35
37
40
42
43
44
48
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
.0
.1
.2
.3
.4
Cents per K. W. Hr.

As a supplement to the tables, in order to more clearly illustrate the relation of the costs, I have constructed diagrams, in which these are represented by different colors.

It will be noticed that these color lines are of various heights, their height corresponding to the cost of the power in cents per K. W. hour. Four colors are used, black equaling the cost of coal, red cost of labor, and blue representing general expense. Those which are operating expenses are laid out above the line, and green, equaling fixed charges, is plotted below the line. The distance from the base line 0 up to 1 represents one cent, and the magnitude of each item is denoted by the length of its color. The diagram for table No. 1 is laid out in six groups, one group for each station. The first or left-hand column in each group represents the costs for the standard station. You will notice that its total length, including the green, is about equal to the distance between 0 and 1, so that, including fixed charges, the cost of power per K. W. hour per annum for the standard station amounts to about one cent. It also appears that the fixed charges are approximately equal to the coal. Labor is roughly about half the coal, and general expense about half the labor. These proportions are simple and easily remembered, and we might expect them to hold approximately for stations under similar governing conditions.

I shall next call to your attention Station No. 3, whose equipment differs from the standard as follows: It has two units instead of three. Each generator is 800 K. W., making a capacity of about half that of the standard. The generators and engines are direct connected, latter being compound condensing, smaller, of course, than the standard, but in other respects similar. Three 500 H. P. water-tube boilers, economizers and heaters complete the important part of its equipment.

Color group No. 3 indicates the cost of power for this station. At the extreme left is standard. The next column showing costs per K. W. hour averaged for one year. At the extreme right of the group is the average for a light month, and at the left of this is the month of high output. It is to be noticed that the total cost of operation for the year is somewhat greater than standard. Coal expense is practically the same. Labor and general expense is somewhat higher. Coal expense being the same does not in this instance indicate that the economy of the station is as good, as, by referring to the table, it will be seen that the pounds of coal per K. W. hour is 2.61 as against 2.2 for standard. This increase is, however, nearly balanced by the reduction in the price per ton, which was $2.60, as against $3.00 for standard. It might be expected that on account of the diminished size of the station the labor expense would be larger, on account of requiring more men per 1000 K. W. An examination of the table shows, in fact, that the men per 1000 K. W. is nearly double what

is required for standard. This would double the labor expense, providing the rate of pay and load factor remained the same, but by a coincidence the rate of pay is lower and the load factor enough higher to bring the labor expense down to nearly standard figures.

To illustrate the effect of a high-load factor in reducing the cost of labor per K. W. hour it will be interesting to look at the next colored column for this station, which represents the cost during January. In this month the load factor was 59 per cent, as against 46 per cent for the year, and it will be noticed that the labor is reduced to less than the standard. The reduction in the total cost for this month, as against the yearly, is also apparent, and this is due principally to the reduction in labor.

It will be seen that the coal expense is but slightly less and seems not to be much reduced by the increased load factor. The explanation of this lies in the fact that the station is tied in with others, which keeps its load from fluctuating even on the low-load factor. This will be still further exemplified by referring to a light month. The column at the right of the group gives the cost for September, during which the load factor was 43 per cent, as against 59 per cent for January. The coal expense is still further diminished, and by reference to the table, will be found to be due to an increase in the efficiency of the station. This might be found to be on account of not having to force the boilers. The increase of labor due to the low-load factor is to be noticed.

I wish to say at this point that it is impossible for me in the limited time to give you more than a general idea of the large number of interesting facts, which may be obtained by careful study of the tables.

Plant No. 2 is somewhat larger than the last and is equipped with 2-1000 K. W. generators direct connected to compound condensing engines. It has also economizers and heaters. Its costs are in column No. 2. In looking at the yearly average it will be noticed that the total costs rise above the standard, and are due to an increase in labor and general expense. Coal, as before, is the same, the decreased efficiency being balanced by the lower price per ton. Examining the table with a view to accounting for the increase of labor we find the load factor approximately the same as standard, but an increase in the number of men per 1000 K. W. This is accounted for by the smaller size of the station. General expense is greater, as would be expected. A glance at the colored diagram representing the heavy month for this station gives a nice illustration of the effect of the high load factor, which is 51 per cent, as against 33 per cent for the year. It is to be noticed that the coal is practically the same, the reduction coming in the other two items. This brings the total cost for the month below standard. In the light

month, with a low-load factor of 28 per cent the labor increase is very apparent.

I shall now present the costs of operation of a large station. Its equipment consists of 6-1200 K. W. generators direct connected to triple condensing engines, 2-1500 K. W. generators direct connected to compound condensing engines, and an auxiliary plant of 40-62 K. W. generators belted to compound non-condensing engines and only used in case of emergency. Economizers, heaters and electric feed pumps complete the important part of the equipment.

Color group No. 4 indicates the costs for this station. The yearly average shows that we are approaching standard figures in labor. This item is not much less, as the units are only slightly greater capacity. Load factors, rate of pay and men per 1000 K. W. correspond very closely with standard. The general expense and coal bring the total somewhat higher. General expense is high on account of the heavy repair account. The station is about eight years old and repairs are heavy, due to replacing of worn out parts. The decrease in efficiency as shown by pounds of coal per K. W. hour might be shown by a test to be due to old boilers. The plants just considered have all been direct connected. Station No. 5 is a belted plant a little more than one-half the capacity of the standard, equipped with 7-340 K. W. generators belted to a countershaft, to which are belted three triple condensing engines, the auxiliary apparatus affecting the economy of the station being economizers and feed water heaters. Color diagram No. 5 represents the costs of a year, and also for the heavy and light months. During the three periods the coal expense remains about the same, but there is considerable variation in the other items, due principally to the change of load factor.

Notwithstanding the high-load factor of 52 per cent, the labor for the year is still above standard. This would be expected from the multiplicity of parts to look after in a belted countershaft station. The reduction of general expense and labor in the heavy month is due to the load factor of 64 per cent.

Diagram No. 6 represents the costs for a belted plant of about one-fifth the capacity of standard. Its equipment is twelve generators belted to four simple high-speed non-condensing engines. There are feed water heaters, but no economizers. High coal consumption is the feature of this diagram. The cost of fuel alone for the year is equal to the total operating expenses for standard. Labor is also high, and the total cost of power per K. W. hour is nearly double the operating expense of standard. This station furnishes a good illustration of the effect on the cost of power of a simple non-condensing belted equipment. It is to be remarked also that this plant has the benefit of a high-load factor.

It will now be interesting to turn our attention to a small direct connected station, which is numbered 1. This operates about thirty

cars. It is equipped with 3-200 K. W. generators, has compound condensing engines and heaters, but no economizers. It does not feed in with other stations, as do those which have been previously mentioned, and has a very fluctuating load, as may be imagined in the operation of so small a number of cars. This station is just one-sixth the size of the standard, and it will be noticed that the column representing its operating expenses is about twice as high. The great increase is in the labor, although the station is operated by a corporation which has had a vast amount of experience in railroad work. Can we account for this increase in labor? By referring to the table we find the rate of pay of men is practically the same as standard; the load factor is low, 22 per cent, as against 33 per cent.

Referring to the heavy month for this station, which has the benefit of a 30 per cent load factor, we find that the labor is reduced, but it is still a long way from bed-rock figures. The examination of the table discloses the fact that the increase comes in the men per 1000 K. W., being about 2.5 times the standard figure. The station records show the following men operating: On the first shift, two engineers and one fireman; second shift, one engineer, one oiler and one fireman; third shift, one engineer and one fireman. Can this number of men be reduced? In a station whose equipment requires that the boilers be hand-fired it is, to say the least, difficult to imagine that the boilers could be operated with less than one fireman per shift. The secret, then, for the large number of men per 1000 K. W. lies in the small number of K. W. capacity. These same men could look after a station of greater capacity.

I shall next give the costs on plant No. 12, whose figures are presented in table No. 2. This plant is about one-third the size of standard. It does not feed in with other stations. Its generators are belted to three tandem compound condensing engines, which operate under steam pressure of 110 pounds. It has water-tube boilers averaging four years of service, heaters, but no economizers. A good quality of bituminous coal is used, which costs $2.93 per ton. By reference to the table it will be seen that this station produced power to the extent of 23 per cent of its capacity during the past year at 1.49 cents per K. W. hour, including fixed charges, the operating expenses alone amounting to a little over one cent. The total cost of operation for the year was $23,000, of which $13,610 was for coal. Water costs this station nothing and the labor was about one-half the coal bill. By referring to the color diagram No. 12 it will be seen that the coal and labor are both much higher than standard and if standard performance had been reached a saving of $10,000 would have been made in the operating expenses for the year. An analysis of the items is given in column No. 12 of the table, and by comparing with standard the differences may be readily seen. I do not wish to be understood in making these comparisons that it would

necessarily pay to make the changes required to effect this saving, my present idea being to bring clearly before you the differences.

Station No. 13 is an interesting combination of cheap coal, simple non-condensing engines, direct connected to the generators, together with a high-load factor. Its capacity is 70 per cent of the standard, major part being 3-800 K. W. generators, the smaller unit is 200 K. W. It produced power to the extent of 42 per cent of its capacity at .96 of a cent per K. W. hour, inclusive of depreciation and fixed charges. The depreciation is charged in at 5 per cent on a capital expenditure of about $60 per K. W. The total expense for the year was $92,617.28, which is made up of

Labor	$15,453.25
Repairs and renewal of steam plant	1,839.69
Repairs and renewal of electrical plant	56.71
Fuel	44,780.94
Water	4,405.40
Oil, waste and lubricants	1,881.53
Tools, appliances and supplies	634.23
Taxes	1,945.65
Insurance	2,146.94
Interest	11,472.94
Depreciation, 5 per cent on $160,000.00	8,000.00
	$92,617.28

The analysis of these items is given for comparison with standard in column No. 13 of table No. 2. The color diagram shows the labor for this station to be equal to standard, principally on account of high-load factor; the other differences are also apparent. It is interesting to note that the road operated by this power station used on an average about 1.3 K. W. hours per car-mile. Total car-miles for the year was 7,207,308, about 10 per cent of this mileage being trail cars. There are other interesting data about this road which time will not permit me to review.

Plant No. 15 is an interesting example of what a multiplicity of units will do for labor, the figure being 6.3 men per 1000 K. W. The effect of this would be much more apparent on the color diagram were it not for the high-load factor and low rate of pay.

Plant No. 16 is of 1600 K. W. capacity. The cost for power for the past year was $53,000. Load factor is the same as standard. Standard operates to produce about double the output for the same figure.

Station No. 28 is 1400 K. W. capacity, has slow speed condensing engines, heaters and economizers. The feed water leaves economizers at the high temperature of 258 degrees. The engines are simple belted to the generators and coal costs but $1.63 per ton.

Plant No. 29 is a compound condensing, slow speed, belted station of 1900 K. W. capacity and feeds in with another station. The coal costs $3.86. Plants No. 30 and No. 31 are operated by the same corporation as No. 29.

No. 32 is a combination of two power houses feeding into the same system. These stations are interesting because these costs are for the past year and since then these two stations, as well as smaller ones operated by the same company, have been consolidated into a large water power plant, from which power is transmitted at 13,000 volts. The two steam stations shown in column No. 32 have five triple expansion condensing engines. This road operated on about 1.4 K. W. hours per car-mile. The coal costs $3.00 per ton. The water power plant which replaced the steam has not been in operation long enough to enable its costs to be given.

Station No. 33 has rather a tall column, due principally to its low load factor of 16 per cent.

Station No. 34, operated at a lower cost than standard on account of the high-load factor, 57 per cent, reducing the cost of labor and low price of coal, which is $1.00 per ton.

No. 35 is a plant of 1200 K. W. capacity, interesting on account of the fact that it has but one unit. It operates with 2.1 men per 1000 K. W. and a load factor of 37 per cent, coal costing $1.24 per ton. Its costs are quite a little lower than standard.

No. 37 is a record-breaker in the opposite sense. It is of slightly greater capacity than No. 35, but has three engines and eleven generators, which require eight men per 1000 K. W. capacity. It had a load factor of but 11 per cent during 151 days from January 1 to May 31, 1898. The effect of this on the cost of labor is very apparent.

No. 40 has a capacity of 9200 K. W. It is direct connected, has economizers and compound condensing engines. Anthracite coal is burned, costing $1.60 per ton. This plant operates at less than standard figures.

No. 42 is a belted plant, compound non-condensing engines, heaters, but no economizers. It has a good load factor, but the effect of the belted and small units shows in all three items.

No. 43 is a combination of alternating and direct current apparatus. It has a low-load factor of 15 per cent, the effect of which is noticed on the labor.

No. 44 is a 6000 K. W. station, and although belted has large compound condensing engines and economizers, which, with coal at $1.60, brings the cost of fuel below standard figures.

It will now be instructive to take a general survey of the color diagram for all stations in table No. 2. No. 37 towers above all the rest. Standard is at the extreme left. Coal in No. 37 is greater than the total operating expense for standard. This station pays but $1.75 per ton, but it uses 7.3 pounds per K. W. hour. Compare

this with No. 35, about the same size plant, paying $1.24 for coal, and using but 4.7 pounds per K. W. hour.

I can hardly ask you to compare the labor, but it is easily seven times as large in No. 37 as in No. 35. The load factor of 11 per cent as against 37 per cent would make this item three times as great and men per 1000 K. W., 8 as against 2.1, would again increase the cost of labor three times. The higher rate of pay in plant No. 35 prevents the discrepancy being greater.

Let us look along the line for high coal cost. No. 16 seems to bear off the palm in this respect—$3.30 per ton and five pounds per K. W. hour accounts for this. For strikingly low costs we have Nos. 34, 35 and 40.

But I am afraid that I hear somebody remark that I am making comparisons that may result in unfavorable criticism, and that I promised not to do, and therefore I will let the diagrams and tables speak for themselves, and assure you that they will reward careful study. Respectfully submitted,

R. W. CONANT.

The President—Gentlemen, you have listened to the very able paper by Mr. Conant. It is now before you for discussion.

Mr. Beggs, Milwaukee—I would ask if there will be a reproduction of these tables in the minutes of the Association?

The Secretary—Everything in connection with the paper will be given in the minutes.

The President—The fullest opportunity will be given for the discussion of Mr. Conant's paper, if you desire to ask him any questions, or wish to criticise the paper in any way.

I think we should formally express our thanks to the writers of these papers.

VOTE OF THANKS TO THE WRITERS OF PAPERS.

Mr. Sergeant, Boston—Mr. President, I would move you, sir, that the thanks of this Association be tendered to all the gentlemen who have prepared papers for this meeting.

Mr. Goff, Fall River—I second the motion. I feel that in relation to Mr. Conant's paper I would be remiss in my duty as a member of the Association if I did not urge that it should be specially recognized as a most valuable piece of work. Mr. Conant has devoted a very great amount of time to its prep-

aration, and he deserves every credit for the work; but the paper is of such a nature that we cannot well discuss it here. We can discuss it among ourselves, after we have it before us in the printed report of the proceedings; but I feel that there should be a special mention of Mr. Conant's name in this connection.

Mr. Beggs, Milwaukee—I desire to reiterate what my friend has just said. I took occasion to give my personal thanks to Mr. Conant. From my experience as a manager of electric light and street railway plants, I thoroughly appreciate the vast amount of labor which he has expended upon the tables in compiling the data from various companies, which is not always placed as clearly as it might be before persons who are going to perform a service of this kind. Mr. Conant's paper is most certainly worthy of special mention. It is hardly practicable to discuss the paper in this meeting. It is rather a paper which we can take up with our technical men, our engineers, and men in charge of power houses; and I believe if the paper is thoroughly considered it will result in a large saving of money to every railroad company which takes the subject up in that way. I desire to second all that has been said in regard to the importance of the paper, and the careful manner in which it has been prepared; also for the admirable way in which it was presented to this meeting.

Mr. Sergeant's motion was put and carried.

Mr. Conant, Boston—Mr. President, I wish to thank the members of the Association for their very kind words; and also for their uniformly courteous replies which were received in response to my requests for data upon which to prepare this paper.

The President—We will now take up the report of the Committee on "Standard Rules for the Government of Conductors and Motormen," of which Mr. W. F. Kelly, General Superintendent, Columbus Street Railway Co., Columbus, Ohio, is Chairman. I understand that Mr. Kelly is indisposed this morning.

REPORT OF THE COMMITTEE ON "STANDARD RULES FOR THE GOVERNMENT OF CONDUCTORS AND MOTORMEN."

Mr. McCormack, Brooklyn—Mr. President, I am a member of the Committee, and have been looking for Mr. Kelly, the Chairman of the Committee, who has formulated a set of rules and regulations for the government of conductors and motormen, to submit to the convention. It was the intention of the committee to ask that the rules, as formulated, be submitted to the Convention, and we would ask that the Committee be continued for another year, and that the sum of two hundred dollars be given to the Committee to have the rules printed and mailed to the members of the Association, in order that any suggestions or criticisms might be made; and after they are printed, if any member of the Association desires to adopt the rules in part or in their entirety, they can do so. It was our idea that after the rules are printed and subjected to this criticism, then the Association can pass on the adoption of the rules next year. The Committee thinks that the rules should be taken up separately, and a discussion had on each rule, and each rule adopted or rejected by the Convention, somewhat in the same way that the standard code of rules was adopted by the American Society of Railroad Superintendents. If the Convention is agreeable to that plan, we would like to have it done.

Mr. Goff, Fall River—I move that the Committee be granted the extension of time asked for, and that we appropriate the sum of two hundred dollars, as they request.

The President—I will say that Mr. Kelly handed me a copy of the proposed report last night, but I had only time to go through half of it before going to bed this morning. It seems to me, from the reading I gave it, that it is something which will be of great value to all the members. It seeks to establish a code of rules for the government of employes, including inspectors, roadmasters, etc., and have them, as far as possible, applicable to every city in the country. It must be apparent to us all that many such rules could be made

universal in their application, and that employes going from one road to another would thereby be better qualified to fill their positions. There are sometimes necessary changes, and at other times desirable changes, and men coming well trained in the rules of the company they have just left will certainly be of great advantage to the employing company.

I believe it is a very commendable move, and that by another year we ought to have the report fully digested, and perhaps ready to send out in a formal manner. Are there any further comments?

Mr. Beggs, Milwaukee—It is desirable that this report should go into the hands of the various companies at the earliest possible time, and there should be no delay. In the case of our own company, we are at present considering the revision of our rules. We might get valuable suggestions from this report, and it should be gotten out with the understanding that it is to be acted upon definitely a year hence. In the line of your own remarks, Mr. President, I appreciate the desirability of some uniformity in the rules governing the employes of street railway companies all over the country. The report should be printed without delay.

The Secretary—I will put it into the hands of the printer as soon as it is received by me, and it will be mailed as soon as printed.

Mr. Beggs seconded the motion of Mr. Goff, which was duly carried.

SUBJECTS FOR NEXT MEETING.

The President—Gentlemen, the Secretary makes a wise suggestion, and that is that all members of the Association as soon as possible send to him a list of subjects upon which they would like to have papers prepared for the next meeting; and at the same time suggest some suitable persons to write the papers. It will facilitate the labors of the Executive Committee very much if you will do this, and I need hardly say that it will add very much to the interest of our next meeting.

VOTE OF THANKS TO THE BOSTON PRESS.

Mr. McCormack, Borough of Brooklyn—If in order, I would offer a motion that the thanks of the Convention be tendered to the representatives of the Boston press for the intelligent and attractive manner in which they have written up the proceedings of the Convention.

Carried.

RESOLUTION OF THANKS TO PASSENGER ASSOCIATIONS.

Mr. Rigg, Reading—Mr. President, I desire to offer the following resolution:

Resolved, That the members of the American Street Railway Association, in annual meeting assembled, express their thanks to the several Passenger Associations of the United States for their courtesy in granting reduced rates to the members of this Association and their friends, who are in attendance upon our annual meeting.

Carried.

ANNOUNCEMENT OF ENTERTAINMENT.

The President—The entertainment for this afternoon will consist of a trolley excursion to Norumbega Park. Special cars will leave the Hotel Brunswick at 2 o'clock sharp, and return at 6:30. There will be a performance at the Park, and everyone is invited to take the trip.

To-night there will be a theatre party at Kieth's Theatre. Delegates wearing the blue button will be admitted with their ladies, upon application at the box-office before 7:45.

REQUEST TO INSPECT EXHIBITS.

The President—I have no doubt that you have all done so, but I hope you will all give as much time as possible to inspecting the display of machinery, etc., on the part of the supplymen before leaving the city.

I understand that our railroad and steamboat tickets are good to leave Boston at any time until next Tuesday night.

INSTALLATION OF OFFICERS.

The President—The only remaining business before the Association is the installation of officers, which is represented by the installation of the President.

I will appoint Mr. Chapman and Mr. Davis a Committee to escort the President-elect to the Chair.

The Secretary will now read the names of all the newly-elected officers.

The Secretary read the names as follows:

President, Charles S. Sergeant, Boston, Mass.
First Vice-President, Henry C. Moore, Trenton, N. J.
Second Vice-President, Ernest Woodruff, Atlanta, Ga.
Third Vice-President, Walton H. Holmes, Kansas City, Mo.
Secretary and Treasurer, T. C. Penington, Chicago, Ill.

Executive Committee:

Albion E. Lang, Toledo, Ohio.
George A. Yuille, Chicago, Ill.
Frank G. Jones, Memphis, Tenn.
John I. Beggs, Milwaukee, Wis.
Ira A. McCormack, New York City.

The President—Gentlemen, it is needless for me to introduce Mr. Sergeant to you, but I desire to say that I appreciate the high honor you conferred upon me a year ago in electing me to this office, and I bespeak for Mr. Sergeant your kind and considerate attention to his communications and requests. If you do as much for him as you have done to make this Boston meeting a success, we shall have a splendid meeting at Chicago next year. [Applause.]

REMARKS OF PRESIDENT-ELECT SERGEANT.

President Sergeant—Gentlemen and Members of the American Street Railway Association: I wish to thank you most heartily for my sudden elevation to office. I feel proud to be permitted to serve you for the coming year. I cannot hope, perhaps, to give as good an administration as my immediate predecessor, Mr. Lang, whose

efforts in behalf of the Association I am sure you all appreciate, and the success which has crowned these efforts, and the long line of past presidents, is one which fills the mind of a new incumbent with some embarrassment, based on the idea that there is a standard which must be upheld.

As to this Association, I feel strongly that it has a great work to do, that its meetings are not merely a pleasant vacation, that it is not called together merely for the purpose of reading and discussing papers, but I believe in the complex relations which are continually coming forward as between the municipalities and the State governments and the street railways, that much is to be gained by concerted action. Certainly in Massachusetts we have benefited very greatly from the fact that our street railways have pulled together for what they know was right, and they have succeeded, after a struggle covering many years, in obtaining a settlement which I suppose looked at from all sides could be called a fair settlement of the relations of the street railways with the community. I hope that the trial which is being made here of this new plan, by which the oppressors of the street railways in a great many communities have been shown by an act of the legislature how far the street railways are liable to perform work which is not in the line of street railway practice, and by which the street railways themselves are compelled to pay a portion of their receipts for the benefit of the highways will be useful to all concerned. It seems to me that all this work which has been done is instructive and is the beginning of a proper recognition of our industry over the whole country. I assure you, gentlemen, when I first went into the street railway business, particularly in the operating department, I was perfectly appalled; it seemed to me I was in an unlawful business, and everybody was down on the street railway, for it was hampered and troubled by one requirement and exaction after another, and when we made complaints, the answer to it all was: "You are in the public streets, you encumber the streets, and you must pay for it." How much better it is to know what we have to pay for than it is to be put to such payment as may devolve upon us in the judgment of some subordinate street department official in some municipality. I think in such ways as that, and in this matter which was taken up the other day, of the mail service, simply in having our case presented, in order to get proper recognition, the Association has a field, perhaps greater than any it has yet filled, and I can only say in closing that so far as it lies in my power to further the work of the Association and benefit the interests of street railways, I shall certainly do so. I thank you very much, gentlemen, for the honor. [Applause.]

President Lang—I now declare the newly-elected officers to be duly installed and take pleasure in handing to President

Sergeant the gavel of the Association, with my best wishes. [Applause.]

President Sergeant—I believe that the Constitution of our Association provides that the newly-elected officers shall enter upon the performance of their duties after the adjournment of the annual meeting; but as it seems that some duty is now to be forced upon me, I suppose for that reason a motion to adjourn would be in order.

ADJOURNMENT.

Mr. Goff, Fall River—I move you, Mr. President, that we do now adjourn, to meet in Chicago in 1899.

The motion was carried and the meeting adjourned.

EXHIBITORS.

There was and could be only one opinion concerning the Boston exhibit. It was an unqualified success from every point of view. Every natural advantage of space, light and air conspired to make it so. The exhibits were of an unusually attractive nature, and were shown to good advantage. There were many unique and expensive displays; and there is no question that all the exhibits received more than usual attention from the delegates in attendance at the meeting. All the supplymen expressed themselves as well pleased with the outcome of their efforts in providing these displays, which have become such an important part of the conventions.

There was a new feature introduced at the meeting this year in the shape of a Bureau of Information. This was presided over by Mr. R. H. Derrah, of Boston, and a number of able assistants. Anything that anybody wanted to know in connection with the meeting or the city could be learned at this bureau; and no item of information or assistance desired was too small to receive careful and prompt attention. Mr. Derrah earned and received the sincere thanks of the delegates and supplymen by his untiring devotion to the business of the bureau. As is customary, we append a list of the exhibitors.

Adams & Westlake Company, Chicago.
American Mason Safety Tread Company, Boston.
American Rail Joint and Manufacturing Company, Cleveland, O.
American Railway Supply Company, New York.
American Wheelock Engine Company, Worcester, Mass.
Anderson Manufacturing Company, A. & J. M., Boston.
Ashton Valve Company, Boston.

Baltimore Car Wheel Works, Baltimore, Md.
Barbour-Stockwell Company, Cambridgeport, Mass.
Barney & Smith Car Company, Dayton, O.
Bemis Car Box Company, Springfield, Mass.
Beverly Machine Works, Beverly, Mass.
Bibber-White Company, Boston.
Billings & Spencer Company, Hartford, Conn.
Bliss Manufacturing Company, R., Pawtucket, R. I
Boardman-Tucker Company, Boston.
Boston Artificial Leather Company, Boston.
Briggs Carriage Company, Amesbury, Mass.
Brill Company, J. G., Philadelphia.
Brown, Harold P., New York.
Burdett & Johnson, Boston.
Burrowes Company, E. T., Portland.

Cambria Iron Company, New York.
Chase & Co., L. C., Boston.
Christensen Engineering Company, Milwaukee.
Cleveland Frog and Crossing Company, Cleveland, O.
Columbia Fare Box Company, Tottenham, Ont.
Columbia Machine Works, Borough of Brooklyn, N. Y.
Consolidated Car Fender Company, Providence, R. I.
Consolidated Car Heating Company, Albany.
Cook's Sons, Adam, New York.
Corning Brake Shoe Company, New York.
Creaghead Engineering Company, Cincinnati, O.
Crosby Steam Valve and Gauge Company, Boston.
Curtis, John C., Chicago.

deWitt Company, E. F., New York.
Diamond State Iron Company, Wilmington, Del.
Dixon Crucible Company, Joseph, Jersey City, N. J.

Electrical Review Publishing Company, New York.
Electrical World, New York.
Ellis, W. F., Boston.
Evans, W. R., Portland, Me.

Falk Manufacturing Company, Milwaukee, Wis.
Forsyth Brothers Company, Chicago.

Gallison Company, Boston.
General Electric Company, Boston.
Gold Car Heating Company, New York.
Graham Equipment Company, Boston.

Ham Sand Box Company, Troy, N. Y.
Hampden Corundum Wheel Company, Brightwood, Mass.
Herrick, A. B., New York.
Heywood Brothers and Wakefield Company, Boston.
Hipwood-Barnett Fender Company, Boston.

International Register Company, Chicago.

Johns Manufacturing Company, H. W., New York.
Johnson Company, Lorain, O.

Kimball, James L., Boston.
Knitted Mattress Company, Canton Junction, Mass.

Lakin Company, J. A., Westfield, Mass.
Lyte Steel and Lead Woven Tread, Boston.

Massachusetts Mohair Plush Company, Boston.
McCardwell, West & Co., Trenton, N. J.
McGuire Manufacturing Company, Chicago.
McLewee, F. C., New York.
McRoy, J. F., New York.
Meaker Manufacturing Company, Chicago.
Mica Insulation Company, New York.
Morris, Elmer P., New York.
Morse, Frank N., Boston.

Newcomb, F. H., Borough of Brooklyn, N. Y.
New Haven Car Register Company, New Haven, Conn.
New York Car Wheel Works, Buffalo, N. Y.
New York Switch and Crossing Company, Hoboken, N. J.
Norton, A. O., Boston.
Nuttall Company, R. D., Allegheny, Pa.

Ohio Brass Company, Mansfield, O.
Ohmer, John F., Dayton, O.

Pantasote Company, New York.
Pearson Jack Company, Boston.

Peckham Motor Truck and Wheel Company, New York.
Pennsylvania Car Wheel Company, Pittsburg, Pa.
Pennsylvania Steel Company, Steelton, Pa.
Pettingell-Andrews Company, Boston.

Railway World, London, England.
Reed, J. D., Boston.
Ridlon, Franck C., Boston.
Robinson Electric Truck and Supply Company, Boston.
Rochester Car Wheel Works, New York.
Rooke Register Company, Peoria, Ill.

Safety Third Rail Electric Company, Boston.
Sampson Cordage Company, Boston.
Scott Spring Company, Charles, Philadelphia.
Shawmut Fuse Wire Company, Boston.
Sherburne & Company, Boston.
Springfield Manufacturing Company, Bridgeport, Conn.
Standard Underground Cable Company, New York.
Stanley & Miles, Whitman, Mass.
Stephenson Company, Limited, John, New York.
Sterling Supply and Manufacturing Company, New York.
Street Railway Journal, New York.
Street Railway Review, Chicago.
Sweet, D. C., Springfield, Mass.
Swift, W. H., Boston.

Taunton Locomotive Works, Taunton, Mass.
Taylor Electric Truck Company, Troy, N. Y.
Thayer & Co., Boston.

Van Dorn & Company, W. T., Chicago.
Van Wagoner & Williams Company, Cleveland, O.

Wadsworth, Howland & Company, Boston.
Wagner Electric Manufacturing Company, St. Louis.
Walker Company, Cleveland, O.
Weber Railway Joint Manufacturing Company, New York.
Westinghouse Electric and Manufacturing Company, Pittsburg.
Wharton, Jr. & Company, Incp., William, Philadelphia.
Wheel Trueing Brake Shoe Company, Detroit, Mich.
Wheeler Car Seat Company, Chicago.
Williams Truss Rail Joint Company, Chicago.
Wood, C. N., Boston.
Woodman Manufacturing and Supply Company, R., Boston.

REPRESENTATIVES OF MANUFACTURERS.

Below are given the names and business of the representatives of manufacturers who attended the meeting, as shown by the register of the Association:

Abadie, E. H., Wagner Electric Mfg. Co., St. Louis.
Abbott, C. L., Lowell Electric Light Corp., Lowell.
Abbott, Ira, Young Lock Nut Co., New York.
Acker, Andrew, Joseph J. Dunn, Hyde Park, Mass.
Ackerman, P. C., American Electrical Works, New York.
Adams, Jr., H. C., Phillips Insulated Wire Co., Pawtucket.
Adams, Walter S., J. G. Brill Co., Philadelphia.
Ager, B. F., Taunton Locomotive Mfg. Co., Taunton.
Ahearn, Thomas, Westinghouse Electric and Mfg. Co., Ottawa.
Ainsworth, F. W., Pettingill-Andrews Co., Boston.
Aitkin, J. H., General Electric Co., Schenectady.
Alchorn, John H., Barbour-Stockwell Co., Cambridgeport.
Alexander, Morris W., Westinghouse Electric and Mfg. Co., Pittsburg.
Allberg, J. H., Standard Therm. and Electric Co., Peabody, Mass.
Allingham, Percy, Tonkin Boiler Co., New York.
Allison, Giles S., St. Louis Register Co., St. Louis.
Amtz, William C., Pennsylvania Steel Co., Boston.
Anderson, Albert, A. & J. M. Anderson Co., Boston.
Angerer, Victor, Wm. Wharton, Jr. & Co., Incp, Philadelphia.
Angier, G. M., Eddy Electric Mfg. Co., Windsor, Conn.
Anthony, James S. Walker Co., Cleveland.
Anthony, Willis M., New Haven Car Register Co., New Haven.
Ashton, Albert C., Ashton Valve Co., Boston.
Ashton, H. H., Ashton Valve Co., Boston.
Atkinson, J. M., J. M. Atkinson & Co., Chicago.
Augher, P. G., C. A. Schieren & Co., New York.
Ayer, B. F., Wendell & MacDuffie, Boston.
Ayer, James I., Am. Electrical Heating Corp., Boston.

Babson, A. D., General Electric Co., Baltimore.
Bacon, Charles, Lyte Steel and Lead Woven Tread, Boston.
Bailey, Charles D., Universal Car Bearings, New York.
Bailey, George C., John A. Roebling's Sons Co., Chicago.
Bailey, Theodore P., General Electric Co., Chicago.
Bailey, William E., Beverly Machine Works, Beverly, Mass.
Bailey, William H., Tonkin Boiler Co., New York.
Bain, W. G., Walker Co., Cleveland.
Baird, John H., Joseph Dixon Crucible Co., Jersey City.
Baird, Robert S., Charles Baird & Co., Wilmington, Del.
Baker, A. E., Baltimore Car Wheel Co., Baltimore.

Baker, E. A., E. T. Burrowes Co., Portland, Maine.
Baker, J. Paul, Baltimore Car Wheel Co., Baltimore.
Baker, John S., Beverly Machine Works, Beverly, Mass.
Baldwin, E. Arthur, General Electric Co., Schenectady.
Baldwin, R. A., New York Switch and Crossing Co., Hoboken.
Baldwin, Stephen W., Pennsylvania Steel Co., Philadelphia.
Ball, C. A., Standard Air Brake Co., Boston.
Ballard, E. V., Safety Third Rail Electric Co., New York.
Barbey, F. A., Thomas Prosser & Son, New York.
Barker, Walter S., New York Insulated Wire Co., Boston.
Barnes, R. N. C., Bryan-Marsh Co., Boston.
Barr, Harry P., Electrical Engineer, New York.
Barr, James C., Wilson, Thomson & Co., Brooklyn.
Barrett, J. W., Hipwood-Barrett Co., Boston.
Barry, Charles D., Henry W. Peabody & Co., New York.
Barry, Charles A., General Electric Co., Schenectady.
Bartholomew, William S., Adams & Westlake Co., Chicago.
Barton, Charles A., Walker Co., Cleveland.
Batchelder, A. F., General Electric Co., Boston.
Bates, James H., Consulting Engineer, Hoboken.
Beach, H. E., Gold Street Car Heating Co., New York.
Beach, R. H., General Electric Co., New York.
Beadle, Edward, Railway Register Mfg. Co., New York.
Bean, George, Meaker Mfg. Co., Pittsburg.
Bell, Louis, Electrical Engineer, Boston.
Benyon, A. E., General Electric Co., Boston.
Beran, T., General Electric Co., New York.
Berry, J. Hall, H. W. Johns Mfg. Co., New York.
Bibber, Charles E., Bibber-White Co., Boston.
Bibber, Thomas H., Bibber-White Co., Boston.
Bigelow, H. T., Hale & Kilburn Mfg. Co., Chicago.
Billings, H. E., Billings & Spencer Co., Hartford.
Billings, William R., Taunton Locomotive Mfg. Co., Taunton.
Birch, C. L., Consolidated Car Fender Co., Providence.
Bishop, R. S., Bethlehem Foundry and Machine Co., New York.
Bissell, Davis S., Duquesne Forge Co., Pittsburg.
Black, Charles H., Walker Co., New Haven.
Blackwell, F. O., General Electric Co., Schenectady.
Blizard, Charles, Electric Storage Battery Co., New York.
Boardman, A. T., Boardman-Tucker Co., Somerville, Mass.
Bodwell, H. E., Pettingill-Andrews Co., Boston.
Boerum, H. H., F. H. Newcomb, New York.
Botfield, Alfred B., Sanitary Engineering Co., Philadelphia.
Bowers, G. H., Peckham Truck Co., New York.
Boyd, F. C., New Haven Car Register Co., New Haven.

Boyd, J. H., New Haven Car Register Co., New Haven.
Bradley, John S., New Haven Car Register Co., New Haven.
Brady, D. M., Brady Metal Co., Derby, Conn.
Bragg, Charles A., Westinghouse Electric and Mfg. Co., Philadelphia.
Brett, J. A., Electric Installation Co., Chicago.
Brill, John A., J. G. Brill Co., Philadelphia.
Briggs, E. R., Briggs Carriage Co., Amesbury, Mass.
Briggs, William O., Briggs Carriage Co., Amesbury, Mass.
Bright, Charles, General Electric Co., Buenos Ayres.
Brinckerhoff, H. G., Fuel Economizer Co., Boston.
Brown, C. R., Pratt & Letchworth Co., Buffalo.
Brown, Frank H., Watson-Stillman Co., Boston.
Brown, E. L., Bibber-White Co., Boston.
Brown, Harold P., Edison-Brown Plastic Rail Bond, New York.
Brown, J. S., Huld Electric Co., Aylmer.
Brown, Ralph G., Johnson Co., Boston.
Brown, R. S., Westinghouse Electric and Mfg. Co., Boston.
Brown, T. J., General Electric Co., Portland, Maine.
Brown, W. H., International Register Co., Chicago.
Brownell, F. B., Brownell Car Co., St. Louis.
Bruen, Frank, Composite Brake Shoe Co., Bristol, Conn.
Buckminster, G. H., Pettingell-Andrews Co., Boston.
Buckner, James, Central Mfg. Co., Boston.
Buehler, J. G., Columbia Machine Works, Brooklyn.
Burdett, A. F., Burdett & Johnson, Boston.
Burleigh, Charles B., General Electric Co., Boston.
Burnaby, William, Westinghouse Electric and Mfg. Co., Boston.
Burrowes, E. T., E. T. Burrowes Co., Portland, Maine.
Busche, J. F., New York Bond and Ticket Co., New York.
Bush, J. E., Chicago Varnish Co., Milwaukee.
Butler, J. S., General Electric Co., Boston.
Byrns, R. A., Walker Co., Buffalo.

Caldwell, Eliot L., Edison Electric Illuminating Co., Boston.
Campbell, Douglas, New York Car Wheel Works, New York.
Candler, E. A., Excelsior Self Oiling Trolley Harp, Detroit.
Carey, Thomas F., Jackson & Sharp Co., Boston.
Carr, Robert F., Dearborn Drug and Chemical Works, Chicago.
Carson, J. H., Sterling Supply and Mfg. Co., New York.
Case, Frank E., General Electric Co., Schenectady.
Christensen, N. A., Christensen Engineering Co., Milwaukee.
Chur, Walter, American Railway Supply Co., New York.
Church, Townsend V., Julian L. Yale & Co., Chicago.
Clapp, J. D., Burdett & Johnson, Boston.
Clark, A. T., American Circular Loom Co., Chelsea, Mass.
Clark, Charles S., Pennsylvania Steel Co., Boston.

Clark, Frank H., Electric Storage Battery Co., Chicago.
Clark, George B., Thayer & Co., Boston.
Clark, W. J., General Electric Co., New York.
Cleveland, R. S., Smith Co., Worcester.
Clitz, R., Johnson Co., Boston.
Coakley, F. J., Sampson Cordage Works, Boston.
Cockey, M. R., John A. Roebling's Sons Co., New York.
Cokeley, John J., Safety Third Rail Co., New York.
Cole, H. A., C. S. Knowles, Boston.
Coleman, Jilson J., St. Louis Car Co., Allentown, Pa.
Coleman, J. W., Coleman Fare Box Co., Tottenham, Ont.
Collins, C. C., General Electric Co., Columbus.
Collins, E. C., Taunton Locomotive Mfg. Co., Taunton.
Colwell, N. H., R. Bliss Mfg. Co., Pawtucket.
Condit, Jr., Sears B., L. A. Chase & Co., Boston.
Conway, M. W., New York Switch and Crossing Co., Hoboken.
Cook, Adam, Adam Cook's Sons, New York.
Cooke, W. J., McGuire Mfg. Co., Chicago.
Corady, J. W., Columbia Machine Works, Brooklyn.
Corten, William, Johnson Co., Boston.
Cosper, W. P., Consolidated Car Heating Co., St. Louis.
Coster, Maurice, Westinghouse Electric and Mfg. Co., Chicago.
Cotten, C. L., Hancock Equipment Co., Boston.
Crawford, A. H., Peckham Truck Co., Boston.
Crossman, Edgar L., Taunton Locomotive Mfg. Co., Taunton.
Crowley, H. J., General Electric Co., Philadelphia.
Curtis, John C., Lawton Fender, Chicago.
Curtz, William C., Pennsylvania Steel Co., Boston.
Curwen, Samuel M., J. G. Brill Co., Philadelphia.
Cutler, A. E., Ashton Valve Co., Boston.
Cutler, Otis H., Ramapo Iron Works, Hillburn, N. Y.
Cutter, Henry B., Cutter Electrical and Mfg. Co., Philadelphia.

Dade, Frank E., Briggs Carriage Co., Amesbury, Mass.
Daggett, Jr., H. M., Lombard Hydraulic Brake Co., Boston.
Daily, Henry, Joseph Dixon Crucible Co., Jersey City.
Daniels, A. L., H. B. Camp Co., Aultman, Ohio.
Darbyshire, Leonard, Advertising Agency, New York.
Darlington, Frederick W., Electrical Engineer, Philadelphia.
Davis, Charles B., General Electric Co., Boston.
Davison, W. J., Christensen Engineering Co., Milwaukee.
Dean, A., Central Mfg. Co., Boston.
Dearborn, E. L., J. A. Lakin & Co., Westfield, Mass.
Dee, A. V., S. & C. Co., Philadelphia.
Devens, Richard, Weber Railway Joint Mfg. Co., New York.
DeVoe, William H., Safety Third Rail Co., New York.

deWitt, E. F., E. F. deWitt & Co., Lansingburgh.
Dick, H. C., Flood & Conklin Co., Newark, N. J.
Dickson, D. T., H. W. Johns Mfg. Co., Philadelphia.
Dodd, J. N., Walker Co., Cleveland.
Dodge, L. L., Blood & Hale, Beverly, Mass.
Doherty, B. A., Mount Hope Ferry Co., Fall River.
Donohue, Francis E., American Electrical Works, Chicago.
Dole, W. M., Boston Artificial Leather Co., Boston.
Dolph, John C., Forest City Electric Co., Boston.
Dow, George W., General Electric Co., Boston.
Dowd, P. A., Dowd Electric Co., Boston.
Dowdell, Augustus, Valentine & Co., New York.
Doyle, W. L., John A. Roebling's Sons Co., Trenton.
Dunham, George J., Wheel Trueing Brake Shoe Co., Somerville, Mass.
Dunlap, W. F., New York Car Wheel Works, Buffalo.
Dunn, David W., Bibber-White Co., Boston.
Dunn, Joseph J., Electric Light Supplies, Boston.
Dutton, W. A., Van Dorn & Dutton Co., Cleveland.
Dyar, A. G., Sterling Enclosed Arc Lamp, Boston.

Earnshaw, Charles, Standard Paint Co., New York City.
Eckert, W. S., John A. Roebling's Sons Co., New York.
Edgar, H. T., Buckeye Electric Co., Boston.
Ellicott, Joseph R., Standard Air Brake Co., New York.
Ellis, W. F., Manufacturers' Agent, Boston.
Emmons, A. P., Wendell & MacDuffie, Boston.
Engel, John G., Adam Cook's Sons, New York.
Engier, G. M., Eddy Electric Mfg. Co., Windsor, Conn.
Ennis, William D., Walworth Construction and Supply Co., Boston.
Entwisle, E. B., Johnson Co., Lorain, O.
Estep, Frank A., R. D. Nuttall Co., Allegheny, Pa.
Esterbrook, H. M., Barney & Smith Car Co., Dayton.
Evans, D. E., Electrical Contractor, Baltimore.
Evans, E. O., J. H. Cornell & Co., New York.
Evans, H. C., Johnson Co., New York.
Evans, O. C., Johnson Co., Boston.
Evans, W. R., Illuminated Car Signs, Portland, Maine.
Evatt, W. M., Clinton Wire Cloth Co., Clinton, Mass.
Everett, Edward, John F. Ohmer Register Co., Dayton.
Eyre, Richard, Johnson Co., Johnstown, Pa.

Fan, A. S., Southern Electric Co., Baltimore.
Farnsworth, H. C., Sawyer-Man Electric Co., Boston.
Fessenden, Robert, Hope Electrical Appliance Co., Providence.
Field, Arthur W., Peckham Truck Co., Boston.
Field, C. J., American Vitrified Conduit Co., New York.

Fiske, Howard C., Howard Pump Works, Buffalo.
Fitzpatrick, J. A., Pennsylvania Steel Co., Boston.
Foard, Joseph R., Pennsylvania Steel Co., Baltimore.
Foley, E. M., J. D. Reed, Boston.
Ford, O. R., Chicago Varnish Co., New York.
Forsaith, C. H., American Mason Safety Tread Co., Lawrence.
Forsyth, W. H., Forsyth Bros. Co., Chicago.
Fowler, George, Briggs Carriage Co., Amesbury, Mass.
Fowler, W. F., Westinghouse Electric and Mfg. Co., Boston.
Fraser, R. C., Ramapo Iron Works, New York.
Frenyear, T. C., Westinghouse Electric and Mfg. Co., Buffalo.
Froeligh, W. B., New Haven Car Register Co., New Haven.

Gardner, E. N., Pettingell-Andrews Co., Boston.
Gardner, James B., Buckeye Engine Co., Salem. Ohio.
Garrison, A. C., Columbia Incandescent Lamp Co., St. Louis.
Garrison, Charles, John P. Cushing Co., Boston.
Gates, J. Holt, Walker Co., Cleveland.
Gay, H. B., Walker Co., Baltimore.
George, James Z., Falk Mfg. Co., Milwaukee.
George, John, "Auto-Motoneer," Chicago.
Gibbon, Thomas H., Lap Joint Railway Track Co., New York.
Gibbs, Charles M., Crosby Steam Gauge and Valve Co., Boston.
Gillon, George L., Watson-Stillman Co., New York.
Gold, Edward E., Gold Street Car Heating Co., New York.
Goodall, George B., L. C. Chase & Co., Sanford, Maine.
Goodall, L. B., L. C. Chase & Co., Sanford, Maine.
Gore, F. S., H. Gore & Co., Boston.
Gordon, J. R., Westinghouse Electric and Mfg. Co., Atlanta.
Grady, James, Columbia Machine Works, Brooklyn, N. Y.
Granger, Francis, Corning Brake Shoe Co., New York.
Granger, John A., New York Car Wheel Works, Buffalo.
Gray, Louis A., Adams & Westlake Co., Chicago.
Gray, W. H., Peckham Truck Co., Chicago.
Greenwood, M. W., Thayer & Co., Pittsburg.
Grier, H. M., Pantasote Leather Co., Chicago.
Griffin, J. M., Wheel Trueing Brake Shoe Co., Detroit.
Griffith, R. E., J. G. Brill Co., Philadelphia.
Guest, John H., Electrical Engineer, Boston.
Gunnison, F. A., Wadsworth, Howland & Co., Boston.

Haasis, A. L., Joseph Dixon Crucible Co., Jersey City.
Hale, G. H., Consolidated Car Fender Co., Providence.
Hale, J., Blood & Hale, Boston.
Hall, Ernest W., Laconia Car Co., Laconia, N. H.

Hallawood, James, Edison-Brown Plastic Rail Bond Co., New York.
Hallberg, J. H., Standard Therm. and Electric Co., Peabody, Mass.
Ham, H. B., Babcock & Wilcox Co., Boston.
Hamlen, W. R., Johnson Co., Lorain, Ohio.
Hammond, W. B., A. A. Griffing Iron Co., New York.
Hanford, Scott, John T. McRoy, Chicago.
Hanna, J. A., Peckham Truck Co., Chicago.
Hanna, J. W., Hanna Solid Oil Co., Chicago.
Hanna, L. A., Peckham Truck Co., Boston.
Harding, E. R., Chicago Rheostat Co., Chicago.
Harding, H. McL., Walker Co., New York.
Hardy, Charles C., American Wheelock Engine Co., Worcester.
Harrington, C. J., Elmer P. Morris, New York.
Harrington, H. C., Sampson Cordage Works, Boston.
Harrington, S. H., Harrington Rail Bonding Co., New York.
Hartzel, Elmer, John A. Roebling's Sons Co., Chicago.
Haskell, G. M., J. G. Brill Co., Hartford.
Haskins, Caryl D., General Electric Co., Boston.
Hastings, George Starr, J. G. Brill Co., Philadelphia.
Hatch, E. B., H. W. Johns Mfg. Co., New York.
Hathaway, Alfred G., Street Railway Supplies, Cleveland.
Hawks, T. C., Walker Co., Malden, Mass.
Haycox, W. E., Fulton Truck and Foundry Co., Mansfield, Ohio.
Hayden, Roy, General Electric Co., Boston.
Held, Charles W., Wilson, Thomson & Co., Brooklyn.
Henderson, James H., New York Electrical Works, Brooklyn.
Henry, F. H., Heywood Brothers, Boston.
Herrick, Albert B., Consulting Engineer, New York.
Hess, H. P., Kosmic Oil Filter Co., Easton, Pa.
Heulings, Jr., W. H., J. G. Brill Co., Philadelphia.
Hickmott, G. F., Boston Brass Co., Boston.
Hicks, J. B., Pratt & Lambert, New York.
High, John M., Pantasote Co., New York.
Hight, Chauncey, Bibber-White Co., Boston.
Hill, C. J., American Vitrified Conduit Co., New York.
Hill, J. M., Bryan-Marsh Co., Chicago.
Hilman, C. D., Methuen Electric Co., Methuen, Mass.
Hipwood, George, Hipwood-Barrett Co., Boston.
Hitchcock, James, Wheeler Car Seat Co., New York.
Hoadley, George M., Bemis Car Box Co., Springfield, Mass.
Hobbs, H. W., Walker Co., Boston.
Hockaday, F. F., A. & J. M. Anderson Co., Boston.
Hodges, Percy, John Stephenson Co., Boston.
Hodgkins, Edward W., The Q. & C. Co., Chicago.
Hoffman, J. Ellis, Wendell & MacDuffie, New York.

Hohnan, C. D., Methuen Electric Co., Methuen, Mass.
Hood, Charles O., R. Bliss Mfg. Co., Pawtucket.
Hood, R. O., General Electric Co., Boston.
Hopewell, Frank B., L. A. Chase & Co., Boston.
Horst, E. V., John Stephenson Co., New York.
Howe, F. P., Wm. Wharton, Jr. & Co., Incp., Philadelphia.
Howell, W. G., John Stephenson Co., New York.
Houghton, C. W., Ashton Valve Co., Boston.
Hubbard, Jr., M. G., McGuire Mfg. Co., Chicago.
Hughes, T. E., Standard Underground Cable Co., Pittsburg.
Hultman, E. G., Barbour-Stockwell Co., Cambridgeport.
Hunt, H. H., Simonds Mfg. Co., Boston.
Hunt, Henry J., Blood & Hale, Boston.
Huntress, F. E., Neal Electric Headlight Co., Boston.

Imlay, L. E., Westinghouse Electric and Mfg. Co., Pittsburg.
Issertel, Henry G., Walker Co., Boston.

Jackman, George W., Springfield Mfg. Co., Bridgeport.
Jackson, C. E., Jackson & Sharp Co., Wilmington, Del.
Jackson, John, Simonds Mfg. Co., Pittsburg.
Jackson, J. Monteith, Jackson & Sharp Co., Wilmington, Del.
Jackson, Newton, American Mutual Indemnity Co., Scranton.
Jackson, William H., Ridgway Dynamo and Engine Co., Boston.
Jefferson, Charles W., Mica Insulator Co., New York.
Jemison, Albert W., Rooke Register Co., Peoria, Ill.
Jewell, J. F., Page Wire Woven Fence Co., Adrian, Mich.
Johnson, C. F., Burdett & Johnson, Boston.
Johnson, J. E., Laconia Car Co., Laconia, N. H.
Johnston, Harry C., Charles Scott Spring Co., Philadelphia.
Jones, B. J., Sargent & Lundy, Chicago.
Jones, C. S., Western Gear Co., Milwaukee.
Jones, Frederick B., Adams & Westlake Co., Chicago.
Jones, F. H., Burdett & Johnson, Boston.

Kahn, Gustavus, Safety Third Rail Co., New York.
Kasson, Robert, Taylor Electric Truck Co., Troy.
Kavanagh, James E., Wm. Wharton, Jr., & Co., Incp., Philadelphia.
Keeler, H. E., Adams & Westlake Co., New York.
Keenan, W. J., Pettingell-Andrews Co., Boston.
Kellogg, E. W., Frank Ridlon Co., Boston.
Kendall, C. C., Simmons Hardware Co., St. Louis.
Kendall, W. D., Worcester Construction Co., Worcester.
Kerschner, W. R., Columbia Machine Works, Brooklyn.
Kilbourn, W. H., Kilbourn Sand Feeder Co., Greenfield, Mass.
Kilvert, Maxwell A., Washburn Coupler Co., Chicago.

Kimball, Frederick M., General Electric Co., Boston.
Kimball, James L., Ridgway Dynamo and Engine Co., Boston.
King, C. K., Ohio Brass Co., Mansfield, Ohio.
King, C. P., Brady Metal Co., New York.
King, J. W., Peckham Truck Co., Providence.
Kingston, William W., Johnson Co., Atlanta.
Kirkland, H. B., American Circular Loom Co., New York.
Kinsman, F. E., Electrical Engineer, New York.
Kissam, George, George Kissam & Co., New York.
Kitfield, E. H., Consulting Engineer, Boston.
Knapp, E. G., Partridge Carbon Co., Sandusky.
Knickerbocker, C. K., Griffin Wheel Co., Chicago.

Lacy, George W., Peckham Truck Co., Kingston, N. Y.
Ladd, E. H., E. T. Burrowes Co., Portland, Maine.
Lapham, Frank A., Cleveland Frog and Crossing Co., Cleveland.
Law, M. D., Walker Co., Cleveland.
Lawless, E. J., American Car Co., New York.
Lawrence, F. W., Lawrence & Wiggin, Boston.
Lawrence, Stewart G., General Electric Co., Boston.
Lawson, F. A., J. G. Brill Co., San Francisco.
Lawton, A. L., Lawton Peerless Fender, Colorado Springs, Col.
Lawton, J. B., Smith & Wallace, Boston.
Leidenger, Joseph, Dayton Mfg. Co., Dayton.
Leidenger, Peter, Dayton Mfg. Co., Dayton.
Lex, Frederic A., Lobdell Car Wheel Co., Wilmington, Del.
Libby, S. H., Sprague Electric Co., New York.
Littlefield, W. R., Pettingell-Andrews Co., Boston.
Livingston, M. S., Standard Ther. and Electric Co., Peabody, Mass.
Lockhart, H. R., General Electric Co., Montreal.
Lockwood, L. A., Crefeld Electrical Works, Pawtucket.
Lomat, J. Acton, General Electric Co., New York.
Long, E. G., Peckham Truck Co., New York.
Long, George E., Joseph Dixon Crucible Co., Jersey City.
Loper, A. N., Rooke Register Co., Chicago.
Loudon, B. T., Swift & McGrady, Boston.
Lougee, Clifford L., Heywood Brothers, Boston.
Lovejoy, J. R., General Electric Co., Schenectady.
Lovejoy, W. A., Charles Scott Spring Co., Boston.
Ludington, R. B., Columbia Refining Co., New York.
Ludlow, W. E., American Rail Joint and Mfg. Co., Cleveland.
Luscomb, Henry C., H. W. Johns Mfg. Co., Hartford.
Luther, B. S., Linton Mfg. Co., Boston.
Luther, Henry R., Barbour-Stockwell Co., Cambridgeport.
Lyall, W. R., General Electric Co., Boston.

MacDonald, A. F., General Electric Co., Boston.
MacDuffie, R. L., Wendell & MacDuffie, New York.
MacGovern, Frank, Rossiter, MacGovern & Co., New York.
MacGregory, F. S., R. Woodman Mfg. and Supply Co., Boston.
Mace, Romaine, Okonite Co., New York.
Macomber, F. B., Leschen-Macomber-Whyte Co., Chicago.
Mahony, J. J., General Electric Co., New York.
Mangree, C. E. S., General Electric Co., Boston.
Mansfield, D. Gardner, Valentine & Co., Boston.
Mansfield, F., Electrical Engineer, Boston.
Manson, D. E., Westinghouse Electric and Mfg. Co., Boston.
Marshall, Oliver W., Duplex Car Co., New York.
Marshall, William, Anglo-American Varnish Co., Newark.
Martin, George E., Springfield Mfg. Co., Bridgeport.
Mason, J. H., Simplex Electric Co., Boston.
Massgrove, E. H., Gold Street Car Heating Co., New York.
Mayer, Charles J., Mayer & Englund, Philadelphia.
McBride, George W., General Electric Co., Boston.
McCardell, J. R., McCardell, West & Co., Trenton.
McCarthy, Louis, W. T. C. Macallen Co., Boston.
McCoy, Frank, Pennsylvania Car Wheel Co., Pittsburg.
McCutcheon, John I., Standard Air Brake Co., Boston.
McDonald, A. F., General Electric Co., New York.
McDonnell, H. E., Electrical Contractor, Leominster, Mass.
McElroy, James F., Consolidated Car Heating Co., Albany.
McGhie, John, General Electric Co., New York.
McGrady, J. H., Swift & McGrady, Boston.
McGurty, James H., McGurty Electric Railway System, Jersey City.
McKenna, E. B., New York Car Wheel Works, Buffalo.
McKinlock, George A., Central Electric Co., Chicago.
McLewee, F. C., Brady Metal Co., New York.
McMahon, J. P., Rochester Hose Bridge Co., Rochester.
McRoy, John T., Manufacturers' Agent, New York.
Meaker, J. W., Meaker Mfg. Co., Chicago.
Medbury, Charles F., Westinghouse Electric and Mfg. Co., Detroit.
Meek, J. Emory, H. W. Johns Mfg. Co., New York.
Meek, Stuart G., H. W. Johns Mfg. Co., New York.
Mendum, A. B., Bibber-White Co., Boston.
Mercur, H. T., Corning Brake Shoe Co., Buffalo.
Merrick, F. R., Johnson Co., Lorain, Ohio.
Merrill, Meldon H., Edison Electric Illuminating Co., Boston.
Metzger, Charles W., McCardell, West & Co., Trenton.
Milbank, L. A., Holmes, Booth & Haydens, New York.
Miles, J. E., Stanley & Miles, Whitman, Mass.
Miller, Carl G. M., L. A. Chase & Co., Boston.

Mix, Charles D., Park Brothers & Co., Pittsburg.
Montgomery, A. F., Crefeld Electrical Works, Pawtucket.
Moore, Arthur S., Boston Artificial Leather Co., Boston.
Moore, A. T., Walker Co., Cleveland.
Moore, Charles K., Lap Joint Railway Track Co., New York.
Moore, F. M., McGuire Mfg. Co., Boston.
Moore, George, Duplex Car Co., Boston.
Moore, H. P., Shawmut Fuse Wire Co., Boston.
Moore, John D., Walker Co., New York.
Moore, James, 2d, Lap Joint Railway Track Co., New York.
Morgan, E. H., Kilbourn Sand Feeder, Greenfield, Mass.
Morrell, Frank A., Sterling Supply and Mfg. Co., New York.
Morrill, Charles E., Valentine & Co., New York.
Morris, Elmer P., Manufacturers' Agent, New York.
Morse, George C., Rochester Car Wheel Works, Taunton.
Munroe, Charles O., General Electric Co., Boston.
Murdock, H. D., Westinghouse Electric and Mfg. Co., Pittsburg.
Murdock, William J., William J. Murdock & Co., Boston.
Murphy, John, General Electric Co., Boston.
Murphy, J. McLeod, Safety Third Rail Electric Co., New York.

Nay, Henry M., Wagner Electric Mfg. Co., St. Louis.
Nelson, L. D., Sterling Supply and Mfg. Co., New York.
Nesmith, S. D., Electrical Constructor, Boston.
Ness, T. W., Holtzer-Cabot Electric Co., Brookline.
Nethercut, Edgar S., Paige Iron Works, Chicago.
Neurath, M. M., Electrical Engineer, Philadelphia.
Newcomb, F. H., Conductors' Caps, New York.
Newell, J. F., J. F. Newell & Co., Gardiner, Maine.
Newkirk, Henry R., Wendell & MacDuffie, New York.
Newman, Edgar A., R. D. Nuttal Co., Allegheny, Pa.
Newtown, H. W., Lap Joint Railway Track Co., New York.
Nicholson, Charles, Hampden Corundum Wheel Co., Springfield, Mass.
North, J. H., Park Brothers & Co., Pittsburg.
Norton, Harry A., Norton Jack, Boston.
Noyes, F. K., Walker Co., Boston.

Ober, George A., C. S. Knowles, Boston.
O'Hearn, John, General Electric Co., Boston.
Ohmer, John F., John F. Ohmer Register Co., Dayton.
Olney, George H., 2d, American Electrical Works, Providence.
Osgood, Richard P., Methuen Electric Co., Methuen, Mass.

Packard, Frank L., American Vitrified Conduit Co., Philadelphia.
Page, A. D., General Electric Co., Harrison, N. J.

Page, F. G., Fayerweather & Ladew, New York.
Paine, F. B. H., Westinghouse Electric and Mfg. Co., New York.
Parker, A. H., The Wire Goods Co., Worcester.
Parker, Frederick E., Watson-Stillman Co., New York.
Parmenter, George A., George A. Parmenter & Co., Cambridgeport.
Parson, J. C., Duquesne Forge Co., Pittsburg.
Parsons, F. B., Safety Insulated Wire Co., New York.
Parsons, J. N., A. Mertes Mfg. Co., Allegheny.
Partridge, Arthur S., Street Railway Supplies, St. Louis.
Pear, Charles B., A. & J. M. Anderson Mfg. Co., Boston.
Peavey, M. V., Adam Cook's Sons, Fall River.
Peckham, Edgar, Peckham Truck Co., New York.
Pemay, Alfred W., Electric Equipment Co., Birmingham.
Perry, F. C., American Car Sprinkler Co., Worcester.
Perry, F. D., American Car Sprinkler Co., Worcester.
Perry, James W., H. W. Johns Mfg. Co., Philadelphia.
Peter, H. E., Adams & Westlake Co., Chicago.
Peterson, William A., Pettingell-Andrews Co., Boston.
Pettee, Edward E., Standard Air Brake Co., Boston.
Pfingst, Louis, Electrical Supplies, Boston.
Phillips, Eugene F., American Electrical Works, Providence.
Phillips, E. Rowland, American Electrical Works, Providence.
Phillips, Frank N., American Electrical Works, Providence.
Pierce, D. F., Bigelow Varnish Co., Newark.
Pierce, Stephen H., George A. Parmenter & Co., Cambridgeport.
Pirie, Robert, Crosby Steam Gauge and Valve Co., Boston.
Plumer, C. S., Westinghouse Electric and Mfg. Co., Boston.
Poor, James W., Poor's Fountain Brush Co., Boston.
Pope, W. H., Bibber-White Co., Boston.
Pope, W. R., Taunton Locomotive Mfg. Co., Taunton.
Porter, George F., The Okonite Co., New York.
Porter, H. F. J., Bethlehem Iron Co., South Bethlehem.
Porter, William, Johnson Co., Cincinnati.
Post, C. J., The Burnet Co., New York.
Post, W. B., Billings & Spencer Co., Hartford.
Potter, W. B., General Electric Co., New York.
Powell, A., Cleveland Frog and Crossing Co., Cleveland.
Powers, Charles P., India Alkali Works, Boston.
Prather, Henry L., Falk Mfg. Co., Milwaukee.
Pratt, G. E., Ajax Metal Co., Philadelphia.
Pratt, George E., Forsyth Bros. Co., Chicago.
Pratt, Mason D., Pennsylvania Steel Co., Steelton, Pa.
Prehn, Edward J., Le Valley Vitae Carbon Brush Co., New York.
Price, Charles B., Pettingell-Andrews Co., Boston.
Price, Frank S., Pettingell-Andrews Co., Boston.

Priest, E. D., General Electric Co., New York.
Prince, Albert E., Boston Artificial Leather Co., Boston.
Prouty, G. M., W. T. C. Macallen Co., Boston.
Provost, George W., R. D. Nuttall Co., Allegheny.
Pugh, D. W., John Stephenson Co., Ltd., New York.
Pullen, C. L., Philadelphia Car Wheel Co., Philadelphia.
Putnam, H. S., Wadsworth, Howland & Co., Boston.

Randall, F. C., Christensen Engineering Co., Hartford.
Randall, J. H., Duplex Car Co., Boston.
Randall, W. M., Randall Car Co., Boston.
Randolph, R. J., Sterling Arc Lamp Co., New York.
Ransom, H. N., Consolidated Car Heating Co., Albany.
Record, E. A., Vacuum Oil Co., Boston.
Record, E. E. D., Vacuum Oil Co., Boston.
Reed, John D., H. Gore & Co., Boston.
Reed, S. G., Crosby Steam Gauge and Valve Co., Boston.
Reinoehl, C. W., Pennsylvania Steel Co., New York.
Remington, C. R., Jr., American Electrical Works, Providence.
Rhodes, James D., Pennsylvania Car Wheel Co., Pittsburg.
Richards, Edward N., Bemis Car Box Co., Springfield, Mass.
Richards, James N., Standard Paint Co., New York.
Richardson, A. H., Pearson Jack Co., Boston.
Richardson, James A., Rochester Car Wheel Works, Liverpool.
Ridlon, Frank, Frank Ridlon Co., Boston.
Riley, Joseph C., Swift & McGrady, Boston.
Rinehart, F. A., Standard Underground Cable Co., Pittsburg.
Robert, Louis E., New York Switch and Crossing Co., Hoboken.
Robeson, D. S., Elmer P. Morris, New York.
Robinson, J. B., Wm. Wharton, Jr., & Co., Incp., Boston.
Robinson, John C., Wm. Wharton, Jr., & Co., Incp., Boston.
Robinson, Edward, Wells Light Mfg. Co., New York.
Robinson, Edward I., Laclede Car Co., St. Louis.
Robinson, William C., Robinson Electric Truck Co., Boston.
Roche, D. S., Charles Scott Spring Co., Philadelphia.
Rockwell, H. B., American Mutual Indemnity Co., Scranton.
Rogers, W. Cogswell, Peckham Truck Co., New York.
Rooke, George F., Rooke Register Co., Peoria, Ill.
Rosenthal, George D., General Electric Co., St. Louis.
Ross, Edward L., Chapman Valve Mfg. Co., Indian Orchard, Mass.
Rowbotham, G. W., Jandus Electric Co., Cleveland.
Rowell, J. L., C. S. Knowles, Boston.
Rundlett, H. E., Edward P. Allis Co., Milwaukee.
Rupert, S., Sterling Arc Light Co., New York.
Russell, Frank D., Rochester Car Wheel Works, Rochester.

Russell, H. H., E. T. Burrowes Co., Portland, Maine.
Russell, W. H., Russell Mfg. Co., Watertown, Mass.
Rutherford, J. A., Johnson Co., Cleveland.

Sanderson, H. A., Wason Mfg. Co., Springfield, Mass.
Sargent, Fitz William, American Brake Shoe Co., Chicago.
Savage, H. M., General Electric Co., Boston.
Saville, George G., Young Nut Lock Co., New York.
Sawyer, F. W., Walker Co., Boston.
Sawyer, W. D., Masachusetts Mohair Plush Co., Boston.
Sawyer, W. H., American Electrical Works, Providence.
Scales, Richmond P., Consolidated Car Heating Co., Chicago.
Schafbauer, Rupert, Keystone Elec. Instrument Co., Boston.
Scott, William M., Cutter Electric and Mfg. Co., Philadelphia.
Scrugham, George R., Creaghead Engineering Co., Cincinnati.
Seaverns, Houghton, United Electric Inspection Co., Philadelphia.
Sheaff, W. N., Sheaff & Jaastad, Boston.
Sherburne, Charles S., Sherburne Co., Boston.
Shields, Edward T., Bibber-White Co., Boston.
Short, Sidney H., Walker Co., Cleveland.
Simmons, B. A., General Electric Co., Boston.
Simmons, G. D., Walker Co., Boston.
Simms, J. P., Rochester Car Wheel Works, Quincy, Mass.
Smith, Clement E., Falk Mfg. Co., Milwaukee.
Smith, F. B., National Arc Lamp Co., Boston.
Smith, H. W., Bibber-White Co., Boston.
Smith, Melian, Walworth Construction and Supply Co., Boston.
Smith, M. L., National Scale Co., Providence.
Smith, Pemberton, New York Car Wheel Works, Buffalo.
Smith, R. D., General Electric Co., Westboro, Mass.
Smith, William M., Chicago Insulated Wire Co., Chicago.
Snow, F. A., H. B. Camp Co., Brookline.
Southgate, H. M., Westinghouse Electric and Mfg. Co., Boston.
Spaulding, H. C., H. W. Johns Mfg. Co., Boston.
Speer, J. H., Partridge Carbon Co., Sandusky.
Stanley, G. E., Stanley & Miles, Whitman, Mass.
Stearns, Charles K., Holtzer-Cabot Electric Co., New York.
Stearns, E. H., Adams & Westlake Co., Chicago.
Stebbins, Theodore, General Electric Co., Schenectady.
Stedman, J. H., Transfer Tickets, Rochester.
Stetson, John, Bridgewater Iron Co., Bridgewater, Mass.
Stevens, J. F., Keystone Electrical Instrument Co., Philadelphia.
Stieringer, Luther, Electrical Engineer, New York.
St. John, E. A., Joseph Dixon Crucible Co., Jersey City.
Strickland, A. H., Rochester Car Wheel Works, New York.

Strickland, F., Rochester Car Wheel Works, Boston.
Strieby, F. H., General Electric Co., Cincinnati.
Stone, Frank J., Electric Storage Battery Co., Boston.
Stone, Theodore W., Electric Mutual Casualty Association, Philadelphia.
Storer, N. W., Westinghouse Electric and Mfg. Co., Pittsburg.
Stout, J. F., William Hall & Co., Boston.
Suckow, Gustav, Vose Spring Co., New York.
Sumner, George F., Knitted Mattress Co., Canton Junction, Mass.
Sumner, George N., Knitted Mattress Co., Canton Junction, Mass.
Sutton, William, American Car Co., St. Louis.
Swan, G. W., John A. Roebling's Sons Co., New York.
Swartz, B. F., McKee, Fuller & Co., Catasauqua, Pa.
Sweet, D. C., Wheel Grinding Machinery, Springfield, Mass.
Swift, W. H., Swift & McGrady, Boston.
Sylvester, John E., Sylvester & Co., Boston.

Taylor, Frank H., Westinghouse Electric and Mfg. Co., Pittsburg.
Taylor, John, Taylor Electric Truck Co., Troy.
Tesseyman, H., Barney & Smith Car Co., Dayton.
Thayer, Winthrop, Thayer & Co., Boston.
Thomas, Joseph N., Blood & Hale, Boston.
Thompson, F. H., Perfection Spring Cushion, Portland, Maine.
Thompson, N. A., Valentine & Co., New York.
Thompson, Samuel B., Electrical Engineer, Baltimore.
Thomson, W. E., Wilson, Thomson & Co., Brooklyn.
Tillinghast, B. D., Duff Mfg. Co., Pittsburg.
Titus, J. V. E., Garton-Daniels Electric Co., Keokuk, Iowa.
Tolman, L. P., Taunton Locomotive Mfg. Co., Taunton.
Tontrup, Louis H., American Car Co., St. Louis.
Townley, Calvert, Westinghouse Electric and Mfg. Co., Boston.
Trainer, H. R., H. W. Johns Mfg. Co., New York.
Trefethen, E. T., A. O. Norton, Boston.
Tucker, Frank S., Boardman-Tucker Co., Boston.
Tupper, G. Aubrey, Taylor Electric Truck Co., Troy.
Turner, William, Thayer & Co., Philadelphia.
Turner, W. C., Thayer & Co., Philadelphia.
Turner, W. S., Consulting Engineer, New York.
Turner, W. O., C. S. Knowles, Boston.
Tuttle, E. O., Pearson Jack Co., Boston.
Tuttle, T. Edward, Pearson Jack Co., Boston.

Upton, Edgar W., Standard Therm. and Electric Co., Boston.

Vander Horst, Elias, John Stephenson Co., Ltd., New York.
Van Dorn, J. H., Van Dorn & Dutton Co., Cleveland.
Van Dorn, W. T., W. T. Van Dorn Co., Chicago.

Van Wagener, J. B., Axle Gear Wheels and Pinions, Pittsburg.
Van Wagoner, C. S., Van Wagoner & Williams Co., Cleveland.
Vaughen, F. G., General Electric Co., Boston.
Vosburgh, A. C., New Process Raw Hide Co., Syracuse.

Wagenseil, C. H., American Electrical Works, Providence.
Walker, E. C., Hampden Corundum Wheel Co., Springfield, Mass.
Walker, W. J., J. P. Sjoberg & Co., New York.
Wallace, J. Edward, Smith & Wallace, Boston.
Wallace, H. T., Diamond State Iron Co., Wilmington.
Waller, C. W., Fort Wayne Electric Corporation, Boston.
Ward, John E., Gold Street Car Heating Co., New York.
Ward, W. W., Westinghouse Electric and Mfg. Co.
Wardley, Thomas W., R. Woodman Mfg. and Supply Co., Boston.
Wardwell, Frederick S., Street Railway Economics, Danbury, Conn.
Warner, R. L., Westinghouse Electric and Mfg. Co., Boston.
Washburne, William A., Cambria Iron Co., New York.
Watkins, S. W., Christensen Engineering Co., Milwaukee.
Watson, W. S., American Electrical Works, Providence.
Wattles, James F., Rand-Avery Supply Co., Boston.
Weaver, H. S., Pittsburg Trolley Pole Co., Pittsburg.
Weaver, Samuel, Keystone Elec. Instrument Co., Boston.
Webb, H. E., Solar Carbon and Mfg. Co., Pittsburg.
Weeks, A. T., Smith & Wallace, Boston.
Weintz, Theodore A. H., The Warrenton Woolen Co., New York.
Welch, Robert W., John A. Roebling's Sons Co., Trenton.
Welsh, John E., American Mason Safety Tread Co., Boston.
Weller, H. W., Campbell & Zell Co., Baltimore.
Wendell, Jacob, Jr., Wendell & MacDuffie, New York.
West, C. L., American Railway Equipment Co., Boston.
Westervelt, Harry, Joseph Dixon Crucible Co., Jersey City.
Weston, Frederick de B., Gold Street Car Heating Co., New York.
Weston, George, Naugle, Holcomb & Co., Chicago.
Weston, Samuel, Boston Artificial Leather Co., Boston.
Whall, F. R., C. H. Whall & Co., Boston.
Wharton, W. W., Electric Mutual Casualty Association, Philadelphia.
Wharton, William, Jr., Wm. Wharton, Jr., & Co., Incp., Philadelphia.
Wheeler, Charles R., Edward Smith & Co., Springfield, Mass.
Wheeler, H. W., Campbell & Zell Co., Baltimore.
Whipp, George S., Contractor, Brooklyn.
Whitaker, A. M., John A. Roebling's Sons Co., New York.
Whitcomb, William W., Composite Brake Shoe Co., Boston.
White, Charles F., Bibber-White Co., Boston.
White, T. C., Central Union Brass Co., Boston.
Whiteley, Frederick W., Sherburne Co., Boston.

Whitney, J. D., Crew-Levick Co., Philadelphia.
Whittaker, C. H., Baltimore Car Wheel Works, Boston.
Whittlesey, J. T., John Stephenson Co., Ltd., New York.
Wick, George, Electric Railway Equipment Co., Cincinnati.
Wight, A. M., Ham Sand Box Co., Troy, N. Y.
Wiley, George L., Standard Underground Cable Co., New York.
Wilkes, Frederick H., L. C. Chase & Co., Boston.
Wilkinson, Arthur L., Ohio Brass Co., Mansfield, O.
Williams, J. Hinckley, Williams Truss Rail Joint Co., Chicago.
Williams, John R., Electric Storage Battery Co., Philadelphia.
Williams, M. S. P., Sterling Supply and Mfg. Co., Boston.
Wilson, Charles, Wilson, Thomson & Co., Brooklyn.
Wilson, Charles H., Manufacturers' Selling Agent, Boston.
Wilson, J. E., Pettingell-Andrews Co., Boston.
Wingate, Charles S., Briggs Carriage Co., Amesbury, Mass.
Winsor, Paul, Southern Electric Co., Baltimore.
Wirt, H. C., General Electric Co., New York.
Wise, Clift, General Contractor, Chicago.
Wood, Charles N., Manufacturers' Agent, Boston.
Wood, N. L., Charles N. Wood, Boston.
Wood, W. C., New York Switch and Crossing Co., Hoboken.
Woodbridge, J. L., Electric Storage Battery Co., Boston.
Woodman, R., R. Woodman Mfg. and Supply Co., Boston.
Woods, Henry, John Stephenson Co., Ltd., New York.
Woodward, A. H., International Register Co., Chicago.
Woodworth, A. C., Consolidated Car Fender Co., Providence.
Woodworth, A. C., Jr., Consolidated Car Fender Co., Providence.
Woolsey, Palmer, American Pin Co., New York.
Wordell, F. C., C. N. Wood, Boston.
Words, Percy Hodges, John Stephenson Co., Ltd., New York.
Worthington, W. W., Q. & C. Co., New York.
Wright, J. H., Wendell & MacDuffie, New York.
Wurster, E. A., Falk Mfg. Co., Milwaukee.

Yardley, John Howard, Pennsylvania Car Wheel Co., Philadelphia.
Young, H. S., Laconia Car Works, Boston.

Zweigbergk, Thorsten v., Walker Co., Cleveland.

ENTERTAINMENT.

The entertainment provided at the Boston Convention by the Massachusetts Street Railway Association was one continuous round of pleasure. There was something on foot for every hour of the day and evening during the entire time

of the convention. We shall attempt to make only a bare mention of the various entertainments and trips planned for the benefit of the delegates.

The first trip was on Tuesday afternoon to Lexington and Concord. In going to the Union Station most of those at the meeting had their first opportunity of viewing the Boston Subway, and all expressed great interest in the structure. A special train of seven cars on the Boston & Maine Railroad took the party to Lexington. Many historical points were inspected at this place. A visit was made to the Battle Monument; and while the party was congregated on the common, facing a flagpole on which was marked "The Birthplace of Liberty," Rev. Dr. Calvin A. Staples, the town historian, gave a brief review of the incidents of the Revolutionary War which occurred at Lexington. A visit was then made to the house in which Hancock and Adams passed the night preceding the Battle of Lexington.

The excursion was then continued to Concord, Mass. Here a number of carriages and omnibuses were in waiting, and the party was driven to the famous battlefield, all the points of interest being pointed out and explained by the drivers of the conveyances. The old homes of Emerson, Hawthorne and Thoreau were passed in the drive, as also the Old Wright Tavern. The statue of the "Minute Man" at the bridge was visited, and also Sleepy Hollow Cemetery, where many who were active in revolutionary times are buried. On the return to the station a brief stop was made at the headquarters of the Concord Antiquarian Society, where many objects of great interest were seen.

In the evening a reception was tendered to the delegates and their ladies at Paul Revere Hall, with music and dancing. The ladies of the Reception Committee received the visitors and a delightful evening was passed. A sumptuous collation was served during the evening.

On Wednesday morning the visiting ladies were taken sight-seeing through the city, accompanied by several guides, who explained all the points of interest encountered on the trip.

In the afternoon special cars took the party to Rowe's Wharf. Here was found waiting the palatial steamer "Myles Standish," the use of which was tendered to the Association by the city of Boston, a compliment which was appreciated by all the members; and the party was joined by Mayor Quincy. There was a pleasant sail to Nantasket Beach, where a shore-dinner was served at the Ocean View House. The afternoon was whiled away in the diversions incident to a seaside resort, and many improved the opportunity of taking a dip in the ocean.

Thursday morning the ladies were taken in tally-hos for a drive along the Parkway, passing through Brookline and Jamaica Plain. They were also driven through some of the best residence streets of the city.

In the afternoon a trip was made to Plymouth in a special train. The party were taken to the famous Plymouth Rock and the National Monument. Pilgrim Hall was also visited, and many historic relics of the "Mayflower" and its passengers viewed. Refreshments were served at the Samoset House, and an early return made to the city.

The annual banquet took place in the evening.

On Friday morning the ladies joined in a shopping tour, and visited several of the large stores in the city.

In the afternoon a trip was made to Norumbega Park, where a pleasant entertainment was provided.

In the evening those who remained in the city went to Keith's Theatre. Many jokes were passed at the expense of the street-railway men present, and the evening was passed pleasantly.

Taking all things into consideration, it would be difficult to imagine how the delegates could have been better entertained. Everyone present felt a debt of gratitude to the Massachusetts Street Railway Association for having made it possible for them to see so many points of interest. The trips were all admirably arranged and there was a surprising punctuality observed in moving the various parties. The weather, although at times rather warm, was, on the whole, pleasant during the entire week.

LIST OF COMMITTEES.

The Committees in charge of the arrangements for the meeting were as follows:

GENERAL COMMITTEE.

C. S. Sergeant, Boston, Chairman.

E. C. Foster, Lynn.
J. E. Rugg, Boston.
C. S. Clark, Boston.
A. A. Glasier, Boston.
C. Q. Richmond, North Adams.
John R. Graham, Boston.
Robert S. Goff, Fall River.
P. L. Saltonstall, Boston.
E. P. Shaw, Boston.
F. H. Dewey, Worcester.

COMMITTEE ON ENTERTAINMENT.

P. L. Saltonstall, Boston, Chairman.

H. F. Eldredge, Portsmouth.
A. B. Bruce, Lawrence.
C. C. Pierce, Boston.
C. W. Wilson, Boston.
J. F. Shaw, Boston.
J. H. Goodspeed, Boston.
J. H. Cunningham, Boston.
B. J. Weeks, Quincy.

W. W. Sargent, Fitchburg.

COMMITTEE ON HALL, HOTELS AND REGISTRATION.

E. C. Foster, Lynn, Chairman.

John F. Morrill, Quincy.
J. N. Akarman, Worcester.
J. H. Studley, Jr., Boston.
J. E. Rugg, Boston.
W. F. Pope, Boston.
R. N. Wallis, Fitchburg.
H. B. Parker, Boston.
George F. Seibel, Taunton.

COMMITTEE ON EXHIBITS.

C. S. Clark, Chairman.

H. F. Woods, Boston.
E. C. Foster, Lynn.
C. F. Baker, Boston.
E. P. Shaw, Jr., Boston.
Franklin Woodman, Haverhill.
R. S. Goff, Fall River.
J. G. Studley, Jr., Boston.
Maurice Hoopes, Lynn.
A. C. Gardner, New Bedford.
Edwin S. Webster, Boston.

W. F. Pope, Boston.

COMMITTEE ON TRANSPORTATION AND INFORMATION.

Julius E. Rugg, Chairman.

N. H. Heft, Boston.
H. B. Rogers, Brockton.
J. F. Wattles, Boston.
Fred H. Smith, Quincy.
A. E. Gordon, Boston.
N. E. Morton, Lawrence.
C. E. Woodward, Wakefield.
Winthrop Coffin, Boston.
H. H. Reed, Fall River.
H. F. Grant, Boston.

COMMITTEE ON BANQUET.

A. A. Glasier, Chairman.

W. A. Bancroft, Boston.
Prentiss Cummings, Boston.
C. S. Clark, Boston.
E. P. Shaw, Boston.
E. C. Foster, Lynn.
S. M. Thomas, Taunton.

LADIES' COMMITTEE.

Executive Committee.

Mrs. E. P. Shaw.
Miss E. S. Shaw.
Mrs. W. B. Ferguson.
Mrs. Frank Woodman.
Mrs. John Graham.
Mrs. E. C. Foster.
Mrs. E. P. Shaw, Jr.
Mrs. F. C. Hinds.

Mrs. P. L. Saltonstall.
Mrs. A. B. Bruce.
Mrs. C. E. Barnes.
Mrs. C. H. Wilson.
Mrs. J. F. Shaw.
Mrs. J. H. Goodspeed.
Mrs. B. J. Weeks.
Mrs. W. W. Sargent.
Mrs. A. A. Glasier.
Mrs. R. S. Goff.
Mrs. C. A. Richardson.
Mrs. J. F. Wattles.
Mrs. J. H. Studley, Jr.
Mrs. H. F. Woods.
Mrs. John F. Merrill.
Miss Katharine M. Abbott.
Mrs. H. Fisher Eldridge.
Mrs. N. E. Morton.
Mrs. G. W. Seibel.
Mrs. W. A. Bancroft.

LADIES AT THE CONVENTION.

In addition to the Ladies' Entertainment Committee, the following named ladies were present:

Mrs. John H. Alchorn, Boston.
Mrs. Theodore P. Bailey, Chicago.
Mrs. John H. Baird, Jersey City.
Miss Mabel L. Baird, Jersey City.
Mrs. E. Arthur Baldwin, Schenectady.
Mrs. F. W. Barbey, New York.
Miss E. M. Barnes, Boston.
Miss E. R. Barnes, Boston.
Mrs. Eleanor Barrie, Boston.
Mrs. C. D. Barry, Schenectady.
Miss Edith Barry, Schenectady.
Miss J. Barry, Schenectady.
Mrs. W. S. Bartholomew, Chicago.
Mrs. Beach, Derby, Conn.
Mrs. R. H. Beach, Orange, N. J.
Mrs. W. Worth Bean, St. Joseph, Mich.
Mrs. A. J. Bechtel, Toledo, Ohio.
Mrs. J. B. Bennett, New York.
Mrs. Thomas H. Bibber, Boston.
Mrs. David S. Bissell, Pittsburg.
Mrs. H. E. Bodwell, Charlestown, Mass.
Mrs. E. C. Boynton, Meriden, Conn.

Mrs. Branion, Derby, Conn.
Mrs. W. B. Brockway, Toledo, O.
Mrs. E. L. Brown, Boston.
Mrs. F. B. Brownell, St. Louis.
Miss Frances J. Brownell, St. Louis.
Mrs. G. Genge Browning, Camden, N. J.
Miss A. Lorence Browning, Camden, N. J.
Miss Carrie O. Browning, Camden, N. J.
Mrs. George H. Buckminster, Boston.
Mrs. James Buckner, Boston.
Miss Blanche J. Buckner, Boston.
Mrs. A. F. Burdett, Boston.

Mrs. J. B. Cahoon, Elmira, N. Y.
Mrs. C. E. A. Carr, London, Ont.
Mrs. F. E. Case, Schenectady, N. Y.
Mrs. Mary E. Chambers, Buffalo.
Mrs. James R. Chapman, Chicago.
Miss Mary H. Chapman, Chicago.
Miss C. P. Chester, Rochester, N. Y.
Mrs. N. A. Christensen, Milwaukee.
Mrs. H. B. Church, Wichita, Kan.
Mrs. J. D. Clapp, Boston.
Miss E. M. Cleveland, New York.
Miss Pauline Clitz, Boston.
Mrs. Ida E. Cokeley, New York.
Mrs. N. H. Colwell, Pawtucket, R. I.
Mrs. W. J. Cooke, Chicago.
Miss Mary E. Cooke, Chicago.
Mrs. E. G. Connette, Nashville, Tenn.
Mrs. T. E. Crossman, New York.
Mrs. Lida A. Cutter, Philadelphia.

Mrs. H. J. Davies, Cleveland.
Mrs. Ernest H. Davis, Williamsport, Pa.
Mrs. Ella F. Dean, Boston.
Mrs. Alice L. De Voe, New York.
Mrs. H. C. Dick, Newark, N. J.
Mrs. L. L. Dodge, Beverly, Mass.
Miss Dorothy Drew, New York.
Mrs. F. E. Donohue, Chicago.
Mrs. R. M. Douglass. Norristown, Pa.
Miss Lillian Douglass, Norristown, Pa.
Miss R. A. Downs, Derby, Conn.

Mrs. John Ehrhardt, Cleveland, Ohio.
Mrs. W. Caryl Ely, Niagara Falls.
Mrs. H. M. Estabrook, Dayton, Ohio.
Mrs. F. A. Estep, Allegheny, Pa.

Mrs. James Fagan, Wilkes-Barre, Pa.
Miss B. S. Fyffe, Derby, Conn.
Mrs. F. H. Fitch, Carthage, Mo.
Miss Flowerre, Kansas City, Mo.
Mrs. W. F. Fowler, Boston.

Miss I. M. Gilbert, Boston.
Mrs. Mary Given, Columbia, Pa.
Mrs. A. D. Gore, Quincy, Mass.
Mrs. George H. Graham, Quincy, Mass.
Mrs. Francis Granger, New York.
Mrs. Frank R. Greene, Chicago.
Mrs. H. M. Grier, Chicago.

Mrs. A. L. Haasis, Jersey City, N. J.
Mrs. G. H. Hale, Providence, R. I.
Mrs. C. J. Harrington, New York.
Mrs. Walter E. Harrington, Camden, N. J.

Mrs. Haskell, Lynn, Mass.
Mrs. G. M. Haskell, Philadelphia.
Mrs. Thomas Hawken, Camden, Maine.
Miss Hayes, Boston.
Mrs. N. H. Heft, Meriden, Conn.
Mrs. J. B. Hicks, New York.
Mrs. J. H. High, New York.
Mrs. James Hitchcock, New York.
Mrs. Walton H. Holmes, Kansas City, Mo.
Mrs. C. O. Hood, Pawtucket, R. I.
Mrs. J. C. Hutchins, Detroit.

Mrs. Henry G. Issertel, Cleveland, O.
Miss Rosa A. Issertel, Cleveland, Ohio.

Mrs. Newton Jackson, Scranton, Pa.
Mrs. C. F. Johnson, Cleveland, Ohio.
Mrs. E. A. Jones, Boston.
Mrs. Frank G. Jones, Memphis, Tenn.

Mrs. W. J. Keenan, Boston.
Mrs. N. C. Keeran, Chicago.
Mrs. W. F. Kelly, Columbus, O.
Mrs. H. J. Kenfield, New York.
Mrs. S. S. Kenfield, Chicago.
Mrs. George B. Kerper, Dayton, Ohio.
Mrs. Fred M. Kimball, Boston.
Miss Nellie L. Kimball, Boston.
Mrs. C. K. King, Mansfield, O.
Miss Rose Knight, New York.
Mrs. George W. Knox, Chicago.
Mrs. A. E. Kornfeld, New York.

Mrs. George W. Lacy, Kingston, N. Y.
Mrs. Albion E. Lang, Toledo, O.
Mrs. Mary S. Lanius, York, Pa.
Miss Grace A. Lanius, York, Pa.
Mrs. F. A. Lapham, Cleveland.
Mrs. S. H. Libby, New York.
Mrs. W. R. Littlefield, Boston.
Mrs. E. F. Lothrop, Schenectady, N. Y.
Miss Bessie Loudon, Boston.
Mrs. W. A. Lovejoy, Boston.
Mrs. J. C. Lugar, Philadelphia.
Mrs. H. R. Luther, Cambridgeport, Mass.
Miss Ardy A. Luther, Cambridgeport, Mass.

Mrs. R. L. MacDuffie, New York.
Miss Mallory, Memphis, Tenn.
Mrs. F. Martin, Chicago.
Mrs. Ira A. McCormack, Brooklyn, N. Y.
Mrs. W. G. McDole, Cleveland, Ohio.
Mrs. John McGhie, New York.
Mrs. Charles F. Medbury, Detroit, Mich.
Mrs. J. C. Meixell, Wilkes-Barre, Pa.
Mrs. David S. Moffat, Brooklyn, N. Y.
Mrs. G. W. Moore, Philadelphia.
Mrs. Emma W. Morse, Taunton, Mass.
Mrs. J. McLeod Murphy, New York.
Mrs. Frank B. Musser, Harrisburg, Pa.

Mrs. S. L. Nelson, Springfield, O.
Mrs. Edgar S. Nethercut, Chicago.
Mrs. F. H. Newcomb, New York.
Miss Florence Newcomb, New York.
Mrs. Harry Norton, Boston.

Mrs. H. C. Page, Lynn, Mass.

Miss Margie S. Page, St. Louis, Mo.
Mrs. M. E. Parmenter, Cambridgeport, Mass.
Mrs. F. B. Parsons, New York.
Mrs. M. V. Peavy, Fall River, Mass.
Mrs. Edward Peckham, New York.
Miss Peckham, New York.
Mrs. T. C. Penington, Chicago.
Miss Maude A. Penington, Chicago.
Mrs. Frederick B. Perkins, Toledo, O.
Mrs. William A. Peterson, Boston.
Mrs. William Pestell, Lynn, Mass.
Mrs. Albert T. Potter, Providence, R. I.
Mrs. E. A. Potter, Providence, R. I.
Mrs. Edward E. Potter, New Bedford, Mass.
Mrs. B. W. Porter, Derby, Conn.
Mrs. G. E. Pratt, Philadelphia.
Mrs. C. B. Price, Boston.
Mrs. A. E. Prince, Boston.

Mrs. H. A. Randall, Boston.
Mrs. R. J. Randolph, New York.
Mrs. Charles A. Raymond, Portland, Maine.
Mrs. H. H. Read, Fall River, Mass.
Mrs. George F. Reed, Springfield, Mass.
Mrs. F. A. Reinhart, Pittsburg.
Mrs. James A. Richardson, Liverpool, England.
Mrs. Edward Robinson, New York.
Mrs. H. B. Rockwell, Scranton, Pa.
Mrs. W. B. Rockwell, Stapleton, N. Y.
Miss Marjorie Rossiter, Brooklyn, N. Y.

Mrs. G. R. Scrugham, Cincinnati.
Mrs. B. S. Scotland, Cleveland, Ohio.
Mrs. George F. Seibel, Taunton, Mass.
Mrs. Charles S. Sergeant, Boston.
Mrs. Edward A. Simmons, New York.
Mrs. J. P. Sims, Quincy, Mass.
Mrs. A. B. Skelding, Wilmington, N. C.
Mrs. H. W. Smith, Boston.
Mrs. E. K. Stone, Jr., Quincy, Ill.

Mrs. C. Taylor, Meriden, Conn.
Mrs. S. M. Thomas, Taunton, Mass.
Mrs. Louis H. Tontrup, St. Louis.
Mrs. E. T. Trefethen, Boston.
Mrs. G. E. Tripp, Lowell, Mass.
Mrs. W. H. Tucker, Syracuse, N. Y.
Mrs. O. S. Tuttle, Boston.

Mrs. Burt Van Horn, No. Tonawanda, N. Y.
Mrs. J. B. Van Wagener, Pittsburg.
Miss Annabel Vining, Cincinnati.

Mrs. H. M. Walker, Manchester, N. H.
Mrs. George R. Warden, New York.
Mrs. Thomas W. Wardley, Boston.
Mrs. William A. Washburne, New York.
Mrs. H. W. Weller, Baltimore, Md.

Mrs. Harry Westervelt, Jersey City, N. J.
Mrs. George Weston, Chicago.
Mrs. H. C. Weston, Rockland, Maine.
Mrs. S. L. Weston, Boston.
Mrs. Joseph Wetzler, New York.
Mrs. Jesse R. Wharton, Butte, Montana.
Miss Jessie Noyes Wharton, Butte, Montana.
Miss Mary S. Whitcomb, Boston.
Mrs. H. C. Williams, Boston.
Mrs. M. S. P. Williams, Boston.
Mrs. L. O. Williams, Springfield, Ohio.
Mrs. J. E. Wilson, Boston.
Mrs. Henry H. Windsor, Chicago.
Mrs. Paul Winsor, Baltimore, Md.
Mrs. W. C. Wood, Brooklyn, N. Y.
Mrs. M. A. Woodman, Boston.
Mrs. Palmer Woolsey, New York.
Mrs. John Wright, Portland, Maine.

Seventeenth Annual Banquet

of the

American Street Railway Association

Hotel Brunswick, Boston

Thursday, September Eight, 1898

MENU

Blue Points

Amontillado

Green Turtle, a l'Anglaise

Sauternes
Cruse & Fils Freres

Filet of Chicken Halibut, Hollandaise Sauce

Tomatoes and Cucumbers *Potato Croquettes*

Clicquot Sec, Yellow Label
" Brut, Gold Label

Tenderloin of Beef, Larded, Mushroom Sauce

Roast Spring Chicken, Giblet Sauce

Delmonico Potatoes *String Beans*

Sweetbreads, Larded, Green Peas

Banana Fritters Glace, au Kirsh

Creme de Menthe Punch

Pontet Canet
Cruse & Fils Freres

Broiled Philadelphia Squab

Dressed Celery *Saratoga Chips*

Chantilly Charlottes *Neapolitan Ice Cream*

Assorted Cake

Fruit

Roquefort and Cream Cheese

Coffee

Toasts

The Commonwealth

His Excellency, Governor Roger Wolcott

The City of Boston

His Honor, Mayor Josiah Quincy

Rapid Transit in Boston

Hon. Geo. G. Crocker
Chairman Rapid Transit Commission

The New England Bar

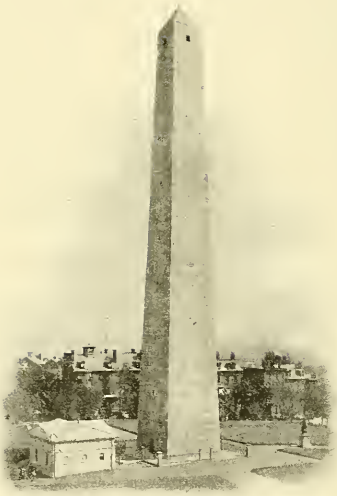
Hon. Samuel J. Elder

Orators and Oratory

Hon. P. A. Collins

The New England Press

Stephen O'Meara, Boston Journal



BANQUET.

The banquet was in keeping with the other features of the meeting. It was a very enjoyable occasion and the "feast of reason and flow of soul" was all that could be desired. The feeling of good-fellowship that ran through the assemblage was most contagious, and broke out many times during the evening. There was much enthusiasm over the playing of the national airs by the orchestra, and encore followed encore. The appointments of the dining hall were very tasteful and the service was excellent.

Many of Boston's most prominent citizens were present, and regrets were received from the following gentlemen:

Horace G. Allen, Boston.
William W. Crapo, New Bedford.
Julius S. Walsh, St. Louis.
Henry M. Whitney, Boston.

REMARKS OF THE PRESIDENT.

At the conclusion of the service of the menu, President Lang called for order and said:

Ladies and Gentlemen: I think what has taken place within the last hour is sufficient to convince us that there is "a hot time in the old town to-night." [Laughter.] What has taken place in the past three days, and what we can see is to come in the future, affords us a clear demonstration that we have not lost sight of that feature of our constitution which provides for the cultivation of cordial and friendly relations. In fact, the air is filled with a feeling of friendship and patriotism. We can see the evidences of it to-night in the singing which has accompanied the playing of patriotic airs by the orchestra.

Through every town I passed on my way to Boston I could see a liberal display of bunting on hill and house-top. We know that all over this country to-day everybody feels patriotic and especially thankful that the war which we have just had with Spain is at an end. This patriotic feeling is not confined to any particular section, but extends all over the country. In fact, it has penetrated the brain of our good-looking Secretary, and prompted him to prepare a pin for this occasion, that not only has the picture of Bunker Hill upon it, but which is mounted upon the finest flag of all the nations of the earth—the Star Spangled Banner. [Applause.]

Now, Boston is distinguished in many respects. Not only is it the birthplace of our Association [applause], but it is practically the

birthplace of freedom, for we are in the neighborhood of Bunker Hill, which commemorates the conflict that was carried on by our forefathers for their personal and political rights. Within the past few days we have seen marching up and down the streets the descendants of those people, just returned from a war waged in the name of humanity. [Applause.]

It seems to me that a monument ought to be erected to perpetuate the ideas, the high purpose, that prompted the recent declaration of war against Spain, and I know of no better place for the erection of that monument than on this historical spot and in this city of Boston. [Applause.]

I stand to-night at the flood-gate of oratory, and I propose to throw those gates wide open, that you may drink the inspiration of eloquence, wit and humor that is to follow, and be thereby uplifted. Acting as I do in the position of precentor, I must not encroach further upon your time, but leave it to the gifted orators, whom I shall have the pleasure to announce. The first regular toast of the evening was set for Governor Wolcott, but it appears that he made a promise that when the Ninth Massachusetts Regiment returned he would meet them, and unexpectedly their arrival is announced to take place to-night and hence he will not be with us. Mayor Quincy is temporarily called from the room, but expects to return later.

TOAST—"RAPID TRANSIT IN BOSTON," RESPONDED TO BY HON. GEORGE G. CROCKER, OF BOSTON.

The President—Since our visit to Boston we must all have been impressed with the great enterprise shown by the citizens of Boston in the construction of the Subway. It is a structure that has been carried through at large expense, and I believe free of all charges of corruption or mismanagement. [Applause.] Anything of that magnitude inaugurated and carried out to such a successful issue, must have been planned, inaugurated and prosecuted by men of honesty and integrity. We have with us to-night a gentleman who is credited with being very nearly, if not foremost in inaugurating the construction of this Subway. He has followed it to its completion, and he will tell us something about it. I take great pleasure in introducing to you Hon. George G. Crocker, Chairman of the Rapid Transit Commission [applause], who will speak to you upon the subject "Rapid Transit in Boston." [Applause.]

Mr. Crocker—Mr. President, Ladies and Gentlemen: The Governor has gone, the Mayor has gone, and unless I mistake the spirit of this occasion everything goes to-night. [Laughter and applause.] We have been having a good time so far, and after I get through you will have a good time again. [Laughter.]

I regard this as the occasion of my life. I have had many opportunities heretofore to speak to street railway men, but never before to-night have I enjoyed the privilege of speaking to street railway women, to the "power behind the throne." [Laughter and applause.] Ladies, I will give you, in accordance with the request of the President, some very dry statistics in regard to the Boston subway.

The Boston subway was built to cure a disease. The streets in the heart of our city, between Beacon Hill and the water front, have been for many years seriously congested. Nowhere was the congestion more grievous and unbearable than along the Tremont street route. The cars on that line dragged their slow length along in mournful processions and at the hours of greatest traffic, especially between five and six o'clock in the afternoon, it was not unusual for cars to take fifteen minutes to go half a mile, and sometimes they were longer even than that. Such was the disease. For many years the whole community had sat at the bedside. There was no dispute as to what the matter was with the patient, but there was a great deal of dispute as to the best method of treatment. Everybody who desired to say anything on the subject had an opportunity, either in the city government, or in the Legislature, or in the daily press, to enlighten or confuse the public. After many years of such discussion, a very able commission, of which the then Mayor of our city, Nathan Matthews, Jr., was chairman, was appointed by authority of the Legislature to study the whole question of rapid transit in Boston and vicinity.

After a year's study of the situation that commission made an exceedingly valuable, interesting and full report, and one of its recommendations was that a short subway, under Tremont street between Park street and Scollay square, should be constructed. As a result of that report the next Legislature provided for the appointment of a subway commission. This commission was appointed five years ago. The next year, four years ago, it reported that its powers were too limited and that the appropriation, two million dollars, was insufficient. Thereupon the Legislature enlarged the commission, added to the three members appointed by the Mayor, two to be appointed by the Governor, gave to the commission enlarged powers, and authorized it to expend a sum not exceeding seven million dollars. It did not require the Commission to build a subway, but it authorized it to build a subway, if it deemed it expedient to do so.

It became, therefore, the first duty of the commission to determine whether a subway was in fact the best remedy for the disease.

Three principal remedies were considered. These were, widening the streets, an elevated road and the subway. I can only briefly state to you the conclusions which we reached. It was found that the land damages for widening the streets would amount to a great deal more than the probable cost of the subway. Widened streets, moreover, would not have accomplished the end aimed at. No matter how wide the street, it would have been impossible, through the heart of the city, with crossings by vehicles and crossings by pedestrians, especially at the numerous intersecting streets, to secure speed and safety of car movement. No matter how wide the street, two tracks would be insufficient to carry the traffic and four tracks would so multiply the dangers as to make the street practically uncrossable. It was found that the cost of an elevated road on the particular route in question would probably be greater than the cost of the subway. In the case of an elevated road the cost is not simply the cost of construction, but to that must be added the damages for injuries to abutting estates. The cost of an elevated road may, therefore, be considered to be made up of its constructive and its destructive cost. The narrower the street and the more important the buildings abutting on it, the greater is this destructive cost. On the Tremont street route it was found that the probable construcive cost of the subway, though greater than the constructive cost of an elevated road, would be much less than the constructive and the destructive cost of an elevated road. The posts of an elevated road obstruct and the structure darkens the streets, and the noise of the passage of the cars is not removed. An elevated road only partially relieves the street. The relief afforded by a subway is absolute.

Months were spent in studying the problem. The underground conditions were thoroughly investigated by our engineering force. Then the commission decided that a subway would be the cheapest and the most satisfactory method of dealing with the problem.

When it was announced that the commission had decided to construct the subway the forebodings of the opponents of the scheme were most dismal. It was predicted that it would never be finished, certainly that it would not be finished in this century and possibly not in the next, that the estimated cost, namely, five million dollars, was far too small, that it would undoubtedly cost twenty or thirty million dollars, and that if it ever should be finished it would never be used unless some company was paid to use it. Of the daily press in Boston, only two newspapers favored the plan. The subway did not receive the avowed approval of any practical railroad or railway man. You have heard that expression used before, "the

practical railroad man." I have noticed that practical railway men often display an unwillingness to launch out into new and untried fields of utility. I am, strangely enough, reminded of the description in George Eliot's "Spanish Gypsy" of Annibal:

> "The experienced monkey who performs the tricks
> Jumps through the hoops and passes round the hat;
> Once full of sallies and impromptu feats,
> Now cautious not to light on aught that's new,
> Lest he be whipped to do it o'er again
> From A to Z and make the gentry laugh;
> A misanthropic monkey gray and grim
> Bearing a lot—"

and here the simile ends—

> "Bearing a lot that has no remedy
> For want of concert in the monkey tribe."

Of course that statement is not applicable to street railway men. [Laughter.] Certainly it does not apply to the members of this Association.

The estimated cost of the subway, as it was made up before we began, was five million dollars; four million dollars for construction and one million dollars for real estate. The subway has been completed, and I am glad to be able to say that the cost is several hundred thousand dollars less than the estimate. [Applause.]

The subway has been built with money provided by the city of Boston, and is the property of the city. Before it was half completed, and before any portion of it was put into practical use, it was leased to the West End Street Railway Company, of which the Boston Elevated Railway Company is the successor, for a term of twenty years, at a rental of four and seven-eighths per cent upon the cost, whatever that cost might prove to be, provided such cost did not exceed seven million dollars. It was estimated that four and seven-eighths per cent would be sufficient to meet the interest on the debt incurred by the city for construction and also the sinking fund requirements. The bonds issued were for forty years. If for the last twenty years of the term an equally favorable lease is made, the city will then own the subway free of cost. [Applause.] The repairs, according to the lease, are to be made by the lessee company. The equipment, including ballast, tracks, electrical equipment, and so forth, is also provided by the company. I take a great deal of pleasure in availing myself of this opportunity to state that the success of the whole undertaking has been materially enhanced by the admirable manner in which the Boston Elevated Railway Company has done its part of the work. [Great applause.] I believe

and I think you will all agree with me, that there is no street railway anywhere in the world which in equipment and in the personnel and character of its service excels the Boston Elevated Railway Company. [Great applause.]

Let me call your attention to some of the special features of the subway. Most of the stations have island platforms, that is, platforms with a track on either side for cars going in the same direction. This arrangement facilitates transfers, and thereby promotes economy of operation. Access to these track-enclosed platforms is secured without crossings at grade by means of stairways connecting with entrance and exit buildings directly overhead. Examples of this may be found on the Common, and in Scollay, Adams and Haymarket squares. The Scollay square platform is a triangle, with a track on each of its three sides.

There is no place in the subway where people are permitted to cross a track at grade. Wherever a crossing is necessary a sub-subway passage is provided.

There is no place in the subway where the traffic capacity of a track is diminished by its being crossed at grade by another track for cars going in an opposite direction. Such crossings at grade have also been avoided by means of sub-subways. One example is to be found at the corner of Boylston and Tremont streets, and another near the Pleasant street exit. This separation of grades for street railway traffic is, I believe, unique, never having been carried out before either in a subway or on an elevated railroad in any city of the world.

The four-track sections of our subway are forty-eight feet wide, with a row of columns in the middle. The two-track sections are twenty-four feet wide, without columns. In electric street railway practice the nearest approach to the Boston subway is to be found in Budapest, where there is a two-track subway operated by electricity, the cross-section of which is four-sevenths as large as the two-track sections of the Boston subway. All other subways in the world which are operated by electricity are single-track tubes.

Ventilation when necessary is secured by electric fans placed in ventilating shafts midway between stations. Air is driven out by these fans and is drawn in at the station openings and at the terminals. It is estimated that these fans will change the air in the subway once every ten minutes.

There is no other subway in the world for street car traffic which is adequately lighted throughout its whole length.

Let me give you some idea of the amount of the traffic which the subway is built to accommodate. It is to be used by the cars of the Boston Elevated Railway Company and the Lynn and Boston Railway Company. The trackage of the first is 250 miles and of the

second 150 miles, so that the total trackage of the two roads is 400 miles. The total length of the subway, it having two branches on the south side, each one-third of a mile long, is one and two-thirds miles. Some sections have two tracks and some have four tracks. The total trackage in the subway is five miles. This is one-eightieth of the whole trackage of the two corporations which are to use it, but it is estimated that one-fifth of the whole traffic of these two corporations will pass through some portion of the subway. These two great corporations carry annually two hundred million passengers. The traffic of the subway will probably be one-fifth of that amount, or forty million. On the opening day last Saturday, judging from the number of tickets that were sold within the subway, it is estimated that the number of people who used it was one hundred and eighty thousand, which would be at the rate of sixty million passengers per annum. The great steam railroad lines which enter Boston on the north and on the south bring to and take from the city each year fifty million passengers.

Ladies and Gentlemen: It was essential that the plan of a structure involving so large an outlay should be well conceived. This was no easy task, but it was simple, indeed, as compared with the difficulties encountered and the skill required in its construction. I know that you will cordially endorse me when I say that the successful construction, through the heart of the city, under thoroughfares which have been kept open for public traffic, of a subway having a base area of about ten acres, within the period of three years and four months, reflects the greatest credit upon our skillful and devoted engineering force, at the head of which is a man with but few peers in his profession, who can have no monument more enduring or worthy than this great work, Howard A. Carson. [Great applause.]

TOAST—"THE NEW ENGLAND BAR," RESPONDED TO BY HON. SAMUEL J. ELDER, OF BOSTON.

The President—Ladies and gentlemen: You will notice that the next toast is "The New England Bar." Now, if you want to find out about the New England bar, I would advise some of the gentlemen who seem to be leaving to remain in the room; it is a different kind of bar than some may be seeking. [Laughter.] There is a great deal of talk in these days about bars; but I am inclined to think that it does not refer to the kind we are to hear about to-night. When you have heard the speaker I am about to announce, you will be thoroughly posted as to the kind that is referred to in this

title. Everybody who has read history knows something about the prominence of the members of the New England bar. We are all proud of those great legal lights who emanated from it, and we have a gentleman who is going to speak to us to-night, who knows a great deal about it, and what he does not know about the bar, he knows about Yale College; and if he sticks strictly to the text I will miss my guess. I have the pleasure of introducing to you the Hon. Samuel J. Elder. [Applause.]

Mr. Elder—Mr. President, Ladies and Gentlemen: I believe I never did succeed in sticking to any toast which was given to me, and I do not imagine that I shall succeed in doing so now, especially after the confusing suggestion which you, Mr. President, have made at the outset. I am left entirely in doubt now as to the kind of bar I am talking about. When I receive your Secretary's courteous invitation to be with you to-night I had no difficulty in understanding that it was a long line of legal luminaries, which New England has given to herself and the world, upon which I was to speak. But I now begin to entertain considerable doubt. I remember hearing Dr. MacKenzie speak of a prohibition town in Maine, and tell about one of his clerical brethren who was lecturing through the State and missed a train, as the result of which he was left overnight in a somewhat forsaken place. He inquired if there were any religious services to be held in town during the evening, and being assured that there were none, he asked if there were any lectures or literary exercises to take place, and being told there were none, he did not know how to get through the evening. But it occurred to him that he might play a game of back-gammon. He went down to the landlord of the hotel, who stood behind a counter, which in some States would probably have been a bar, and said: "My good sir, I find myself somewhat stranded here to-night; could you accommodate me with a game of back-gammon?" The hotel keeper replied, softly: "Certainly; step up to your room, and I'll be there in a minute." Presently he came up, buttoned to the chin in a long coat, closed the door, locked it, unbuttoned his coat and took out a bottle of whiskey. The clergyman was aghast: "What do you mean? I asked you for a game of back-gammon, and here you bring me whiskey?" "Oh, well," said the landlord, "that's all right; some of 'em call it one thing and some call it another, but they all mean the same thing." [Applause.]

As to the bar you refer to, sir, I fancy you and I mean about the same thing. I have been very much interested in your meeting. An occasion like this, which brings together people from all over the

United States and Canada, has a significance which no local banquet can possibly have. We used to feel that the country was divided into sections, north, east, south and west. And often since the Civil War there have been doubts as to whether the country would ever solidly reunite. One of my friends from Kentucky, whom I am sorry to say is not here to-night, told me of his first removal to New York city. He was a gentleman of dignity in Kentucky. He desired to register as a voter after residing a proper time in the city of New York. Inquiring where the booth was, he was sent from the avenue where he lived down well nigh to the river front, where he was confronted by a gentleman who wore a large white waistcoat, and large diamond in his shirt front, and looked across at him. The gentleman said: "I desire to register." The man said: "What name, sorr?" "My name is Richard Theobald." "Where do you come from?" "I come from Kentucky, sir." "Have you your naturalization papers wid you?" [Laughter and applause.]

But to-night, when I heard the band play "Maryland, My Maryland," when the Mayor of Boston came in, and you all joined in tumultuous applause, and when the friends in front of me burst into rapturous applause over "'Way Down South in Dixie" I felt entirely assured that no longer was there any north, any south, any east, or any west; but one grand whole. [Applause.] The glory of this sort of occasion is that it brings men of all sections together and it teaches us that we are brothers and have a common country. There is no longer an aggregation of States, but one nation, under one flag. [Great applause.] When you fairly made the welkin ring as the orchestra played "The Star Spangled Banner," and the memories of the last five months swept over us, and we remembered that an insult to the flag brought us as powerful response from the south as it did from the north, from the west as from the east, then we could all feel absolutely sure that we were one, and that the country was now and forever safe. [Applause.]

Mr. President, I cannot help recalling the fact that last summer in England nearly every place of amusement open in the summer had the American biograph. Of course, most of the scenes were English, and most of them related to the Queen's jubilee, then so recent, but all of them closed with two or three American scenes. One was the magnificent rush of the Empire State Express on the New York Central road, and nearly all of them closed with the charge of the United States Cavalry at its encampment in Vermont, and I assure you, ladies and gentlemen, your response to the national song was no more enthusiastic, no more unanimous than English audiences everywhere gave when the band played "The Star Spangled Banner." [Great applause.]

But I was to speak about "The New England Bar." You will

not expect me to give an historical sketch of it, I am very sure. You will not expect me, as a very humble member of it, to eulogize it. Perhaps I may be pardoned for saying, as Mr. Webster said in the United States Senate, referring to Massachusetts: "There she stands; she needs no eulogy; look at her." Mr. President, you have kindly suggested that the New England bar had given to the country some of its most brilliant and its strongest men, and I may be pardoned for saying that a bar which has given, not only to itself, but to America, such names as Jeremiah Mason, Daniel Webster, Rufus Choate and Lemuel Shaw requires no eulogy. It is sometimes said, however, that the New England bar is no longer pre-eminent, and this may be true. But, Mr. President, a bar which in recent years has given us and given you a Sidney Bartlett, a Richard Olney, a John D. Long and a Tom Reed requires not to shade its face under a too great mantle of modesty.

The relation of the bench and bar to the questions which have grown out of the rapid development of street car transit, has been important and interesting. The exercise by private corporations of extensive powers in the public streets—especially of maintaining fixed rails in thoroughfares which still remained the property of the State—of propelling large vehicles over them, and latterly of maintaining structures and wires for the distribution of electric power, has given rise to important and far-reaching questions. And yet the development of the street railway has called for the creation of no new principle of law whatever, nor for the modification of any existing principle. As late as 1860 the great Chief Justice of Massachusetts, Chief Justice Shaw, apologizing for the writing of a long opinion, said that street cars in the city of Boston had become so frequent and the probability of their extension into other parts of the State was so great, that their relations to the public and to the highways required careful consideration and statement. That was thirty-eight years ago. After what you have heard with regard to the Boston subway, mark how short the span is! In that decision, as the gentlemen of my profession who are about me will recall, General Bancroft on the one side and the Chairman of the Rapid Transit Commission (Mr. Crocker) upon the other side, it was established that a street car has the right of way over its tracks as against any more slowly moving vehicle. [Applause.] And that decision, so far as I am informed, has obtained in the highest courts of every State in the country, following the Massachusetts decision. But there was nothing new; all that was determined was along familiar lines of the law of the road. Every man has a right to use the highways, but he has from the earliest times been obliged to use them with reasonable regard to the rights of others to use them. If he delayed traffic and obstructed the street it was a public nuisance punishable

by indictment. Ergo, the driver of a heavy wagon who keeps a wheel in a car track obstructs travel and goes to jail. No new principle; just an assertion of the old law.

It was jocularly suggested to me by a street railroad manager before I came in, that the relations between the street railway men and the bar, unlike the quality of mercy, were usually strained; and no doubt he had in mind the never-ending suits for personal injury. They also illustrate my point. In all the intricate decisions that have been written in connection with suits for personal injuries, there has been absolutely no new principle evolved. The statement concerning due care and contributory negligence of the old courts has obtained with multitudinous illustrations in every street car case. No better enunciation of the law has ever been made to a jury in this State, I am confident, than that read by one of our judges from an old stage-coach decision, decided fifty years ago, in which the identical provisions and principles governing the law to-day were enunciated.

In the last few years since the introduction of electric traction, a fundamental question and one of life and death importance has arisen and been determined, so far as this State is concerned. When horses gave way to electric power, when the motive power ceased to be that with which our forefathers were acquainted and with which they propelled their vehicles, when the power became akin to that of steam railroads, the question arose: "Is a new servitude imposed upon the street? Does the electric railway become liable to pay damages to the abutting owner?" Everything hung on that. If it did, electric railways must be abandoned, because the damages involved might be prohibitive. But following out the oldest lines of thought the court reached the conclusion that so long as an ordinary vehicle might use the street in conjunction with the electric cars, it was akin to the old use and not akin to the exclusive use of its location by the steam railroad. [Applause.]

I have said to you thus far, and you have borne with me kindly, that, so far as the law was concerned, no new principle has been evolved or needed for street railways. But what tremendous changes in the life of the people the street railways have brought about! The old highway was the "King's Highway." His troops marched along it, his mail was carried over it, it was held open for him, and for the use of the man with the carriage. So late as 1855 there was no general law on the statute book of Massachusetts in regard to sidewalks for pedestrians. The street, the highway, was primarily for the use of the rich, and not to accommodate the purposes of the poor. Your work, Mr. President and gentlemen, has revolutionized all that. You gather in your conventions, believing that you are seeking the best appliances for your work, and so you are; believing

that you are seeking to protect the money interests and corporate power which are vested in you, and so you are. But after all, the thing which you represent is the great irresistible sweep of a public, democratic movement, in this country, and in the world. The change in the use of the highways since John Hancock drove down Beacon street with his coach and six, is shown to-day. The man with a nickel in his pocket rides more safely, more comfortably, in a carriage better lighted, better warmed and better adapted to his needs than in the richest private equipage. [Applause.] You mark, gentlemen, the distinction between the old and the new. In every addition you make to the public convenience and comfort you recognize that you are the servants of the people. Some of the powers of the State are delegated to you in the use of the highway, but delegated as a public trust. Modern historians dwell upon the improvements and the changes in the life of the people, which one generation after another has seen, as well as upon wars and the succession of kings; and it is well worth while to record the time when stoves were first used in houses, what the first lights were, when the first umbrella was invented, when streets were paved and when Peel put policemen along London streets, and a thousand other such things. The latter half of this century has shown inventions in all departments, which eclipse anything which centuries before had produced. But I venture to predict, Mr. President, that when the history of this century is written, it will contain nothing more notable than the words "Street railways introduced and perfected." [Applause.]

TOAST—"THE NEW ENGLAND PRESS," RESPONDED TO BY MR. STEPHEN O'MEARA, OF BOSTON.

The President—It is with great regret that I have to announce that Mr. P. A. Collins, who was to have responded to the next toast, "Orators and Oratory," was unexpectedly called from the room, on account of trouble that arose in his eyes. He is well known in the city of Boston, and, in fact, throughout the country, as an orator of great ability, but it is very fortunate for us that in his absence we have been given and are yet to receive many examples of orators and oratory. We now come to the toast entitled "The New England Press," prominently among which stands the Boston Journal, and equally prominent is the gentleman who is editor of that paper. I now have the honor of introducing Mr. Stephen O'Meara. [Applause.]

Mr. O'Meara—Mr. President, Ladies and Gentlemen: I think that in some strange manner the toastmaster must have mislaid or misarranged his introductions. I am neither an orator nor the creator of oratory: I am simply a plain, innocent newspaper man. As such, I have listened with keen interest to the speech of my friend Squire Elder, who has just taken his seat. I noticed that he was true to the principles of his profession, inasmuch as that, while he was lavish in commenting on decisions which had been made already, he was very careful to give no opinion on any unsettled question without the usual fee. [Laughter and applause.] In fact, one of the embarrassments under which I labor this evening is the circumstance that of the six men whose names appear on the card five are lawyers, and I am thrown among them helpless and unarmed. [Laughter.]

I had supposed that in the absence of his excellency, the Governor, of Mr. Collins, and of his honor, the Mayor, at least temporarily, I might have picked up some of the crumbs which properly belonged to them; but on weighing the whole matter and looking back on the proceedings of the last sixty or seventy minutes, I find that while my friend Mr. Crocker has confined himself to the topic which the committee in its generosity gave to him, Mr. Elder undertook to respond, not only for "The New England Bar," but "The Commonwealth," "The City of Boston" and "Orators and Oratory" [laughter]; and but for an unwillingness on my part that I should be regarded as dropping into slang, I should appeal to this intelligent audience to say whether or not that was a "fair deal!"

It was fortunate in one respect for me, unquestionably fortunate for you, that I came here this evening without specific preparation as to what I should say. I have an idea that an after-dinner speech cannot be prepared; that it depends too much on the spirit of the occasion, upon the quality of the audience, and upon the things and the subjects treated by the preceding speakers. I had held that opinion, I say, but I must confess that after having heard Mr. Crocker and Mr. Elder, I am partly, at least, a convert to the other view, because they certainly showed careful and thorough preparation; and I leave it to you to say whether or not they were successful. [Laughter.]

Now, if I had fallen into the trap which is sometimes laid for the unwary, if I had undertaken to make careful preparation for this after-dinner speech, I should have been completely betrayed; because until my arrival in the reception rooms I had had no idea that ladies were to be present, and if I had prepared my speech it would have been a speech suitable for men only. [Laughter.] I should have been worse off than if I had taken no thought at all on the subject. I do not mean that there would have been anything in

the speech which by any possibility would have drawn a blush to the cheeks of the young person, but men are dull and heavy-witted. [Laughter and applause.] They have not that faculty of quick appreciation; they have not that swiftness of intuition, which I am happy to say women possess in so marked a degree. Now, I hope that in what I have said in the last few sentences I have placed myself at least in as good position relatively as my friend Crocker did when he extolled the virtues of the railway women as compared with the railway men. I know that in this company it is the railway women who must be looked out for. It is getting to be the case in almost any company. The railway man is tough and serviceable; he has been toughened by long contact with an over-critical and not particularly scrupulous public. I have no intention whatever of flattering him to-night. The relations which usually exist between the street railway man and the newspaper publisher are of such a character that if I should undertake to flatter him those who do not know me would deny that I was a publisher at all, and I do not wish to be put under that kind of suspicion.

I have discovered in my innocence, partly to-night and partly on previous occasions similar to this, that one of the tricks of the experienced and confirmed after-dinner speaker like my friend Elder—who, by the way, is at it all the time, he is no tyro, he is a professional, not merely of the law, but as an after-dinner speaker—if you think all those pretty little hesitancies, and all those cute little breaks, were not thought out carefully in advance, you are very much mistaken. [Applause.] If you want simplicity, if you want candor and innocence, you must quit the lawyer and turn to the newspaper man. Now, I say that I have learned a great deal from these professional after-dinner speakers—men who practice for after-dinner speaking jointly with the law, one hand helping the other, as it were—and one of the things I have learned is that a trick of the confirmed after-dinner speaker is to assume a certain warmth and geniality with reference to the particular company which he happens to be addressing, to assume that there is a great deal in common between the profession or occupation of those to whom he speaks and his own; and sometimes it is a very severe strain upon the truth and a great wrench of the credulity of his hearers.

But I want to say to you without the guile of which a lawyer seems absolutely incapable of divesting himself, I want to say to you without guile, and in a certain measure seriously and soberly, that there are many points of resemblance between the street-railway business in which you are engaged and the business of publishing a daily newspaper; there are many decided and striking points of resemblance. In the first place, in my judgment, and I am speaking with perfect seriousness, there are no two occupations which get

closer to the public; I do not mean to the heart of the public, but to the fist or the foot, and, unfortunately, we are little nearer to those than you are. But the street railway manager and the daily newspaper publisher are very close to the public—whether that relation may be good or bad, whether it may be a relation of profit or otherwise. You are subjected to criticism, just as we are. The criticism which comes to you undoubtedly seems as unreasonable to you as much of the criticism which comes to us seems to us; and yet it is our business to endure patiently, it is our business to improve our service in so far as improvement may be possible, and then to gather in such trifling rewards as may remain at the end of our toil.

That brings me most naturally to a few words as to our great local street railway system. In the utter lack of preparation, which I have confessed to you, I intended to depend largely upon what I could gather up, by way of hint or suggestion, from the speakers who were to precede me; in other words, my purpose was to live off the enemy, which in a certain measure I have succeeded in doing. I noticed in Mr. Crocker's speech that the two things, apart from his magnificent and subtle eulogy of the railroad woman, which won the greatest applause were that the subway had been built within the appropriation and without corruption and that the Boston Elevated Railway, as it is now called (the West End Railway seems more natural to me), is probably the best managed street railway system in the universe. [Applause.] I have evidence bearing on the latter point. It is my fortune to live in one of the humble suburbs, not the aristocratic suburb of Cambridge, where my friend over there, the vice-president of the company, lives, and I find that the enthusiasm of the people on that line is such that hour after hour and day after day, almost at any time of the day or night, you can see groups of women standing on the street corners waving their handkerchiefs and umbrellas, jumping up and down in their enthusiasm, because the cars as they go by are so crowded that they cannot get on. [Applause.] You will also see tender and delicate women—not exactly railroad women—standing on the back platform in the midst of the smokers, and where, I understood from an intelligent conductor to-day, his instructions were that not more than eight persons should be permitted to stand. I bring these facts forward as collateral evidence of the universal enthusiasm with which the people of these suburbs regard the Boston Elevated Railway Company.

Now, proceeding to the comparison—which, I beg to assure you, will not be prolix, and, as far as it lies in my power, will not be tedious—proceeding to the slight comparison which I had begun to make between the daily newspaper and the street railroad, you recognize, and it has been admirably expressed here to-night by Mr. Crocker and Mr. Elder, the enormous obligations under which you

rest to the inventor of modern times. You know what you have won from the brain of the inventor, as to the motive power, as to the methods of propulsion—as to the hundred and one things which to the public are obscure, but to you as practical men are absolutely plain and palpable. I venture to say that even within the last five years, certainly within the last ten years—that, I think, will cover the period of the practical application of electricity to street railways—within the last ten years the daily newspaper has had more from the inventor, reaped more benefit from the invention of new machinery, than even the street railways. There is no daily newspaper in Boston to-day on which the type is set, or, to be technical, composition is carried on, in the same way as five years ago; and up to five years ago there had been substantially no change for four hundred years. Up to five years ago the type was set in the best daily newspaper office in this country, whichever one that may be, amid such a perfect flood of excellence—but assuming that we could select the best and most prosperous daily newspaper in this country, the type was set in that office, within five years, in substantially the same way that it was set by Gutenberg and his apprentices four hundred years ago. The separate types were taken from the box and put in the "stick," and for one hundred years men had been trying to substitute machinery for that motion. I have heard old printers say, many and many a time: "When you put brains into the machine you can get type set by a machine and not till then."

But it is being done to-night. The type-setting machine, so to speak, is a paradox; the type-setting machine of to-day is a type-casting machine. A certain German-American by the name of Mergenthaler determined to go to the root of the difficulty which had always overthrown the invention of a successful type-setting machine, instead of undertaking to imitate the movements of the compositor, conceived the idea of casting his type in the act of setting it. That proved to be the key to the whole thing, and after an expenditure of two million dollars on the part of the company, with hardly a ray of sunlight to be seen, it is now an enormous success. That machine is now in use in almost every newspaper office in the country.

Going to the other branch, every mechanical department in the newspaper business in this country has been absolutely revolutionized within the past ten years. It is but little more than ten years since the process of stereotyping made it possible to reproduce without limit the number of plates from a form of type. It was the introduction of stereotyping which made it possible to bring into use the modern newspaper press, which I regard as the great mechanical marvel of this century, electric street railways to the contrary notwithstanding. Within fifteen years the best we could do with the

newspaper press was to print about nine thousand copies an hour on one side of the sheet only. We have to-day presses in this city, within my own care, one press in particular, which will print seventy-two thousand papers in an hour, on both sides, cut, pasted, folded and counted! That briefly represents the mechanical advance in one department of the daily newspaper, all accomplished practically within fifteen years; and accomplished, very much of it, within the years of my own experience in the business. Such a machine as that costs a great deal more than a first-rate country town hall. It would cost to-day from sixty to seventy thousand dollars. It has the strength, the size, the weight, even, of a locomotive, and the delicacy of adjustment of a watch. The manufacturers tell me that in making the cylinders, of which there are many in a press of that size, that a variation between diameters of a thousandth part of an inch will be sufficient to prevent the acceptance of the cylinder. The cylinders must run with absolute accuracy.

It gives me great pleasure to say—especially in the light of the enthusiasm and patriotic Americanism which my friend Elder induced, and, I think, also, Mr. Crocker—as my little contribution to the waving of the flag to-night, that the best newspaper presses in the world are made in the United States. The best newspaper presses in the world are the invention and the product of Americans. R. Hoe & Co., of New York city, who are the great press manufacturers, though there are others who are good, have had in London, England, for twenty-five years an establishment, in which they employ the best mechanics and the best mechanical talent in the Kingdom of Great Britain and Ireland. They pay the highest wages; and yet, if a London newspaper or magazine orders a press, that has to be particularly good and meet particularly exacting requirements, the press is made in Grand street, New York, and sent to London! [Applause.]

Now, that is a truth which reaches further than the mere surface; it speaks, according to my mind, of the vast and fundamental difference between the foreign workman and the American workman. It means that, after twenty-five years of effort in London, after twenty-five years of collecting and training men, after all, the finest work, the work which requires the keenest effort of brain and the subtlest movement of the hand, must be done in New York.

And this leads me to the thought that the daily newspaper, in its wonderful development, by means of these mechanical improvements, has elevated labor side by side with the street railway. I can remember when I was a young fellow that the street car conductor or the street car driver was regarded either as a man who had just come from the country, and was doing something to pay his board until he could find something better to do, or he was some one who

had failed in some other direction, and had been driven to the platform of a street car. We knew him as the drudge of seventeen or eighteen hours a day, with his wages lower than those of the street laborer, far lower than those of the average mechanic. Now, to-day, so far as Boston is concerned, I am proud to say—I have joked about this local octupus of ours, but I am speaking seriously now—I am happy to say that the regard which the public has for these men on the platforms of our city railway cars is absolutely changed. We know now that they are receiving decent wages for decent hours of work. We know that no man is overworked or oppressed. We know he is earning good wages, as good as the average mechanic, year in and year out. We know that it is no longer true that a street car conductor or driver would not see his small children from Sunday to Sunday. We know that if he is on early he is off early; if he is on late, he goes to work late. That is an enormous satisfaction to the riding public, which, after all, is not so absurd and exacting and unjust as we, both street railway men and newspaper publishers, are sometimes, in moments of impatience, inclined to think.

So I will close these rambling remarks which I have made, which have certainly been without plan, though I cannot say without purpose, for I have had in mind the purpose possibly to interest you a little, certainly to make my acknowledgments to you for having afforded me the opportunity to be here to-night. I will close, therefore, with the thought which is uppermost in my mind at the moment, and it is this—that the street railway man and the newspaper publisher, both of whom feel very often the injustice, the roughness, and the harshness of this great public, may rest assured of this one thing—that to both of them is open the same road, the road of progress, of enterprise, of honesty, of fair-dealing, of liberality in their relations to this great, blind and sometimes stupid public, and if you and I follow that line legitimately, steadfastly and constantly to the end, we may feel very sure that to us will come finally such poor rewards as this world affords. [Applause.]

REMARKS OF HON. J. CARROLL PAYNE, OF ATLANTA, GA.

The President—Ladies and gentlemen: Among the memorable features of our present meeting in Boston are the many surprises which we have met on every hand, and which have contributed so much to make our stay pleasant and profitable. I have made a discovery which will add very

much to our pleasure and profit when I make it known. I have discovered a man who has electrified the whole South with his eloquence; and I am about to draft him into service. I can assure you that he did not expect to be called upon when he came into this room, but I am sure he will speak to us very briefly, at least. I now call upon the Hon. J. Carroll Payne, of Atlanta, Ga.

Mr. Payne—Mr. President, Ladies and Gentlemen: I have been vilified, overrated and misrepresented several times in my life, but never have I been so overrated as by the remarks of the President. I am not an orator, and never made a speech as one. I am a plain street railway man. He has gotten this misconception from some source absolutely unknown to me, and I am not responsible for it. You will discover his mistake before I sit down. I shall certainly be brief.

I desire to say that Georgia, the Empire State of the South, and Atlanta, her capital, through me, uncover and bow in respect and reverence to the city of Boston and the great Commonwealth, Massachusetts. [Applause.] Georgia is proud, as a sister should be, of your greatness, your wealth, your culture, your refinement and your hospitality. [Great applause.] Hospitality may not be a virtue, it is at least a grace and you possess it. When I was asked to-night to say something I at first declined; but upon reflection I felt it to be a duty, which I owed to those whom I represent in my State, and to myself, to thank in this presence these good people who have shown us such courtesy, such unbounded and generous hospitality on this occasion. [Applause.]

I and those with me from the State of Georgia are the product of what is termed the New South. This was an expression coined and used to great advantage by a man certainly known in your city, Henry W. Grady. [Applause.] He created the expression, and I feel satisfied that the echo of his voice is still to be heard in this great city, though he has passed away. But I will say one thing with reference to the New South which is new, because the opportunity has not yet been given to any one to discuss it. I refer to the fact that when this country went to war with Spain, upon the ground which is highest, I believe, as a cause for conflict, that of humanity—this war with all its evils was productive of great good, because it has made absolutely a New South and a New North. [Great applause.]

I have had no toast given me, but in a moment I will propose one, which I think will meet with universal approbation. In other

words, this war has shown us this fact, for if we will turn back the leaves of history just written during the past few weeks in the island of Cuba, we will find shoulder to shoulder the sons of the New North and the New South, with faces turned to the common foe; and whether these gallant soldiers were facing pestilence and fever at Siboney, or shot and shell upon El Caney's hill, whether at San Juan or Santiago, the same story is told of the brave boys from both sections of the country standing side by side facing the enemy. If we turn from land to sea, whether in eastern or western waters, what a picture is presented! We annihilated at one sweep, as it were, the navy of a power which stood fifth in the rank of the navies of the world, and destroyed the very name of Spain as a maritime power. But wherever we look, even upon the deck of the ill-fated Merrimac, with her forlorn hope, going to what seemed certain death, between the shot and shell of El Morro on the one hand and the Estrella battery on the other, I say that we found the North and South standing closer than ever before to each other, and giving their lives for the benefit of our common country. [Applause.] But above all, ladies and gentlemen, towering above the New North and the New South, I see the form of the New Nation standing strong and proud, serene and free, with the eyes of the civilized world upon her. She has taken her stand with the great ones of the earth, and her prowess has no equal in the history of warfare. From the burning heart of her own fortitude and power, the pulsations of her strength and prowess beat around the world to-day. My toast, then, ladies and gentlemen, is the New Nation. [Applause.]

REMARKS OF GEN. WILLIAM A. BANCROFT, OF BOSTON.

The President—I am sure that you will all like to hear a word or two from a member of our own craft, and especially from a man who has been referred to this evening as being connected with one of the finest street railways in the United States. I am about to introduce to you a face familiar in the city of Boston, one well known to most of the street railway men in the country, a man who gave up his occupation in connection with the street railroad a short time since and shouldered his gun to fight the cause of humanity. I refer to Brigadier-General William A. Bancroft, of Boston, whom I now call upon. [Applause.]

General Bancroft—Mr. President, Ladies and Gentlemen: The late Mr. P. T. Barnum was once asked what his chances for salva-

tion were. He said: "I have the greatest show on earth." [Laughter.] Fortunately for Mr. Barnum he did not live long enough to witness the proceedings of the seventeenth convention of the American Street Railway Association, or he might not have been so positive in his assertion.

The people of Boston have been very much gratified at your presence as their guests during the past week. I have sat here to-night and listened with much interest to the native simplicity and undoubted veracity of my fellow-townsmen, the lawyers and the editors [laughter], eulogizing the progressive character of our work and of their work, and they have pointed out how you have summoned the great force of nature, the great force of electricity, which I have no doubt propels these great type-setting machines as well as the street cars; and they have suggested, or at least the Chairman of the Rapid Transit Commission did, that you had summoned a force even more powerful than the force of electricity, which lights this chamber—"the light that shines from ladies' eyes," a light that has proved so powerful, so dazzling, that it has driven from your presence at least one of the orators this evening, for his eyes could not withstand such a brilliant light.

I do not know whether I am expected by your President to pronounce the benediction, the hour is so late, but I do want to say a word in appreciation of one thing you have done, and I think I may say it with propriety before this intelligent audience—I think that has been the characterization very properly used by my friends—in behalf of the directors of the company which I represent here to-night to some extent, I want to thank you for one thing you have done, and that is in electing as your President for the ensuing year an official of our company whom we have learned to respect and admire for his intelligent observation, his industry and his sagacious foresight—the second vice-president of our company, Mr. Charles S. Sergeant, of Boston. [Applause.] In so far as I may with propriety, I wish to thank the street railway men for the honor they have conferred on our company and conferred on themselves by the election. [Applause.]

I hope that you have had at least a passable time in this old towns of ours, and we trust that you will carry away with you the pleasantest recollections of your visit. [Applause.]

And now, Mr. President, if the prediction made earlier in the evening, that "there would be a hot time in the old town to-night" is to be fulfilled, there remains but to thank you for your kindness in calling upon a representative of our company, and I thank you also, ladies and gentlemen, for your attention. [Applause.]

REMARKS OF THE PRESIDENT-ELECT, MR. CHARLES S. SERGEANT, OF BOSTON.

The President—One of the pleasantest ceremonies of this occasion is the introduction of the President-elect by the retiring President. I was hoping to do so in language fitting the occasion, but General Bancroft has taken the words from my mouth, and has so nicely introduced our President-elect, Mr. Charles S. Sergeant, that I will now ask him to arise and address us for a few moments. [Applause.]

Mr. Sergeant—Mr. President, Ladies and Gentlemen, Members of the American Street Railway Association: I am extremely sorry that my voice is such, owing to a cold, that I am unable to make a display of oratory. I am a noted orator, and if I only had a voice you would have a sample of it. I suppose it is quite improper for the President-elect to do more than to show his head; his duties come in the following year. Also, being a modest man, I have been blushing behind the table here for a few minutes, expecting that I would be called upon.

I wish to thank you heartily for coming to Boston and seeing our city and suburbs, and the supplymen for giving us such a wonderful exhibit; and I thank you still more for the honor you have conferred upon me, and I assure you, that while I am quite inexperienced in presiding over a convention as important as this, I shall do all that any one can do—I shall try to do my best.

I believe that this is the seventeenth birthday of the Association, and it is just getting to that point where it ought to go to work. I think that the coming together once a year for social intercourse and for quiet exchange of views in regard to management, and in regard to machinery and appliances, is most useful; but beyond that I think there is work which can be kept up through the year—that is in working up difficult questions, questions in which our interests and the interests of the public are involved, and which all street railway men know must result—if they result in a right decision—in a manner which will be equally beneficial to the public and the company; for I believe that nothing is truer than that success in a public transportation company is gained by doing the right thing for the public and the best thing for the public, whether the public knows it or not. I thank you for your attention. [Applause.]

CLOSING REMARKS OF PRESIDENT LANG.

President Lang—Since coming to Boston I have been so busy in convention matters and sight-seeing that I have not

been able to read the newspapers to any extent, and hence I do not know how fully our proceedings have been reported; but there is one thing I desire to tell you, which took place in the convention this morning, and that was the passage of a resolution thanking the ladies of Boston, the mothers, wives, sisters and sweethearts of the members of the Massachusetts Street Railway Association, for the very kind and hospitable manner in which they have entertained the ladies accompanying the members of our Association, and the other ladies in attendance upon the convention. [Applause.]

I am requested to announce that the Street Railway Association of the State of New York will hold its sixteenth annual convention on Tuesday and Wednesday of next week at the Manhattan Beach Hotel, Coney Island.

To-morrow evening there will be a theatre party to attend the performance at Keith's Theatre. The cars will leave the Hotel Brunswick at 7:30 and the seats will be held until 7:45 o'clock, and no later. All those who hold the blue buttons of the Association will be admitted on showing the button; and also any ladies who may accompany them.

Now we will close the exercises of the evening by singing the first verse of "America."

My country 'tis of thee,
Sweet land of liberty,
Of thee I sing;
Land where our fathers died,
Land of the pilgrim's pride,
From every mountain side
Let freedom ring.

REPORT OF THE COMMITTEE ON MEMORIALS OF DECEASED MEMBERS.

Messrs. McCulloch, of St. Louis, Mo., and Wyman, of New Orleans, La., appointed by President Lang as a Committee on Memorials of Deceased Members, have filed the following obituary notices with the Secretary:

REUBEN F. BAKER.

Reuben F. Baker was President of the Columbia Railway Company, of Washington, D. C., and Secretary and Treasurer of the Norfolk and Washington Steamboat Company at the time of his death, which occurred suddenly, due to heart failure, on the evening of March 23, 1898. He had been at his place of business during the day and appeared to be in good health. Mr. Baker was born in Montgomery county, Maryland, in 1838, and had been engaged in the wholesale grocery business in Washington for many years. He was elected President of the Columbia Railway Company in 1891, and had been connected with both of the above-named corporations for more than ten years. A widow survives him.

JULIUS S. GRINNELL.

Julius S. Grinnell (late General Counsel, Chicago City Railway Company), was born in Massena, St. Lawrence County, N. Y., in 1842; son of Dr. J. H. and Alvira (Williamson) Grinnell, natives of Vermont. Mr. Grinnell was married October 5, 1869, to Augusta Hitchcock, daughter of Dr. William Hitchcock, of Shoreham, Addison County, Vt. Mrs. Grinnell and two children, a boy and a girl, survive him. His ancestors, remotely, were both French and Welsh. They have been traced back to Grinnelle, now a considerable manufacturing village just east of Paris, and within the fortifications of that city. They emigrated first to Wales, and subsequently to this country, one branch of the family tree spreading from New York, another from Connecticut, and the third from Vermont. Of the latter branch Mr. Grinnell is a member. He was educated in the schools of his native town, and fitted for college at Potsdam Academy, St. Lawrence County, N. Y., taking a full course in the Middlebury (Vt.) College, graduating in the summer of 1866. He entered the office of Hon. William C. Brown, of Ogdensburg, as a law student and was admitted to practice before the State Supreme Court in 1868. He practiced his profession and taught school in the Ogdensburg Academy for a time, and came to Chicago in December, 1870. Here he practiced law continuously until 1879, when he became the Democratic candidate for City Attorney, and although his party was not then in power he was elected by a decided majority, and in 1881 and in 1883 his majorities were increased, indicating the public approval of his official actions. In November, 1884, he was elected State's Attorney for Cook County, and his career in that office is

so closely interwoven with the history of Chicago that it has become part and parcel thereof. The famous Anarchist case was a fitting climax to a singularly brilliant career. Among the other celebrated cases that were prosecuted by him were the Joseph C. Mackin ballot box investigation, which resulted in conviction; the three Third ward ballot-box thieves, which also resulted in the conviction of one offender, the other two having made their escape; the McGarigle and McDonald boodle cases, and the "Omnibus" boodle cases, in which he was eminently successful in securing the conviction of the "boodlers;" McDonald and McGarigle were convicted, but McGarigle escaped to Canada and McDonald secured a new trial from the Supreme Court. In the trial of the Anarchists, Judge Grinnell stood by his guns in the face of threats and intimidations, and did his duty so well and so fearlessly that he won the respect and admiration of every patriotic member of the community. He was elected Judge of the Circuit Court in 1887, and served with distinction on the bench until 1891, when he resigned his judgeship to accept the position of General Counsel of the Chicago City Railway Company, in which position he remained until his death, taking successful part in a series of cases among the most important to street railways in the jurisprudence of Illinois.

On June 8, 1898, while in the midst of his friends and associates, fighting nobly for his company's interests, Judge Grinnell passed suddenly away. His demise caused universal sorrow throughout the great city, and left a vacancy at the Bar that will long remain unfilled. His remains were interred in Oakwoods Cemetery, Chicago.

MORRIS W. HALL.

Morris W. Hall was for several years Secretary of the Camden and Suburban Railway Company, of Camden, N. J., and died in that city May 3, 1898. He was the chairman of the meeting for organization of The Street Railway Accountants' Association of America, held in Cleveland, March, 1897. Mr. Hall was a man of most kindly disposition, and was highly esteemed by those who knew him.

CHARLES B. PRATT.

Charles B. Pratt, ex-Mayor of Worcester, Mass., died in that city May 9, 1898. He was in the seventy-fifth year of his age, having been born in Lancaster, Mass., February 14, 1824. His early occupation was that of a submarine diver, which he followed for twenty years, and assisted in the raising of many sunken vessels in the

Atlantic and Great Lakes. For many years he was identified with the street railway interests of Worcester, and was President of the Worcester Consolidated Street Railway Company at the time of his death.

In 1876 he was elected Mayor of Worcester. For sixteen years he was President of the Worcester Agricultural Society. He was for a long time President of the First National Fire Insurance Company, and a Director in the First National Bank, of Worcester. He was a thirty-second degree Mason, and a member of several Masonic and Pythian organizations and a large number of general societies.

Mr. Pratt married when a very young man. His wife was Lucy Ann Brewer, who died in 1895, just after their golden wedding. One son survives them, Charles T. Pratt, of Boston, and a granddaughter, Lucy, the wife of Rev. Charles L. Short, assistant rector of All Saints' Church, of Worcester.

CHARLES B. REAVIS.

Charles B. Reavis died suddenly in Augusta, Ga., August 2, 1898. He was born in Joplin, Mo., and was in his thirty-fourth year. He had lived in Augusta six years, and was the Auditor of the Augusta Railway and Electric Company.

Mr. Reavis married Miss Mary Wells, of Kansas City, in 1896. He was a Mason, a Knights Templar and an Elk. In the death of Mr. Reavis the community lost an upright and patriotic citizen, the street railway company a valuable and faithful official, and his many friends a gallant and estimable companion.

M. W. SQUIERS.

M. W. Squiers, who was one of the pioneers of Chicago and Superintendent of the North Chicago Street Railroad Company early in its history, died in that city June 20, 1898. He was sixty-six years old and leaves a widow, two daughters and three sons.

FRANK S. STEVENS.

Frank S. Stevens was born in Rutland, Vt., August 6, 1827, and died at Swansea, Mass., April 25, 1898. Mr. Stevens was President of the Globe Street Railway Company, Fall River, Mass., from 1884 to 1897, and was Chairman of the Board of Directors at the time of his death.

JAMES A. STRATTON.

James A. Stratton, Secretary and Treasurer of the Birmingham Railway and Electric Company, Birmingham, Ala., died on Sunday morning, February 27, 1898. He was born in Aurora, Ill., and for six years was bookkeeper of the First National Bank of that city. He subsequently went to Birmingham and became bookkeeper of the Alice Furnace Company, and later assisted in the organization of the Birmingham Railway and Electric Company, and became its Secretary and Treasurer. He was at one time a Director in the First National Bank of Birmingham, and at the time of his death was President of the Jefferson County Building and Improvement Company and Secretary and Treasurer of the East Lake Land Company.

Mr. Stratton, although religious in temperament, was at the same time appreciative of the gayeties of life, and was an agreeable mixer with other men, and good company at an entertainment. He was unostentatious in manner. In business matters he was the perfection of exactness, and was endowed with an unsual amount of executive ability, which combination made him particularly valuable to the company in whose service he was at the time of his death.

SPECIAL COMMITTEES, 1899.

Special Committees to submit papers at the next meeting will be appointed during the year by the Executive Committee.

NEXT REGULAR MEETING.

The Eighteenth Regular (Annual) Meeting will be held in Chicago, Ill., in the autumn of 1899.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN STREET RAILWAY ASSOCIATION.

CONSTITUTION.

NAME.

I. The name of the Association shall be "The American Street Railway Association," and its office shall be at the place where the Secretary resides.

OBJECT.

II. The object of this Association shall be the acquisition of experimental, statistical and scientific knowledge, relating to the construction, equipment and operation of street railways, and the diffusion of this knowledge among the members of this Association, with the view of increasing the accommodation of passengers, improving the service and reducing its cost; the establishment and maintenance of a spirit of fraternity among the members of the Association by social intercourse, and the encouragement of cordial and friendly relations between the roads and the public.

MEMBERS.

III. The members of this Association shall consist of American Street Railway Companies, or lessees, or individual owners of street railways; and each member shall be entitled to one vote by a delegation presenting proper credentials.

AMENDMENT.

IV. This Constitution may be amended by a two-thirds vote of the members present at a regular meeting, after the proposed amendment shall have been submitted, in writing, at the preceding regular meeting and a copy sent to each of the members.

BY-LAWS.

APPLICANTS.

I. Every applicant for membership shall signify the same, in writing, to the Secretary, enclosing the requisite fee, and shall sign the Constitution and By-Laws.

OFFICERS AND EXECUTIVE COMMITTEE.

II. The Officers shall consist of a President, three Vice-Presidents, and five others, who shall constitute the Executive Committee, and a

Secretary and Treasurer. The Executive Committee shall have the entire charge and management of the affairs of the Association. The Officers and Executive Committee shall be elected by ballot, at each regular meeting of the Association, and shall hold office until their successors shall be elected. The duties of Secretary and Treasurer shall be performed by the same person. The Secretary and Treasurer shall not be a member of the Executive Committee.

DUTIES OF OFFICERS.

III. The officers of the Association shall assume their duties immediately after the close of the meeting at which they are elected; they shall hold meetings at the call of the President, or, in his absence, at the call of the Vice-Presidents, in their order, and make arrangements for carrying out the objects of the Association.

PRESIDENT.

IV. The President, if present, or in his absence, one of the Vice-Presidents, in their order, if present, shall preside at all meetings of the Association and of the Executive Committee.

TREASURER.

V. The duties of the Treasurer shall be to receive and safely keep all moneys of the Association; to keep correct accounts of the same, and pay all bills approved by the President; and he shall make an annual report to be submitted to the Association. He shall give a bond to the President in such sum, and with such sureties, as shall be approved by the Executive Committee.

SECRETARY.

VI. The duties of the Secretary shall be to take minutes of all proceedings of the Association and of the Executive Committee and enter them in proper books for the purpose. He shall conduct the correspondence of the Association, read minutes and notices of all meetings, and also papers and communications, if the authors wish it, and perform whatever duties may be required in the Constitution and By-Laws appertaining to his department. He shall be paid a salary, to be fixed by the Executive Committee.

MEETINGS.

VII. The regular meeting of the Association shall be held at such time between the fifteenth day of September and the fifteenth day of December, in each year, as the Executive Committee may decide to be best suited to the locality in which the meeting is to be held; the time to be decided on and each member of the Association notified of the selection by the first day of March in the year in which the meeting is to be held. Special meetings may be held upon the order of the Executive Committee. Notice of every meeting shall be given by the Secretary, in a circular addressed to each member, at least thirty days before the time of meeting. Fifteen members shall constitute a quorum of any meeting.

ORDER OF BUSINESS. (1.)

VIII. At the regular meeting of the Association the order of business shall be :

1. The reading of the minutes of the last meeting.
2. The address of the President.
3. The report of the Executive Committee on the management of the Association during the previous year.
4. The report of the Treasurer.
5. Reports of Special Committees.
6. The election of Officers.
7. The reading and discussion of papers of which notice has been given to the Secretary, at least thirty days prior to the meeting.
8. General business.

ORDER OF BUSINESS. (2.)

IX. At other general meetings of the Association, the order of business shall be the same, except as to the 3d, 4th and 6th clauses.

NOTICES.

X. The Secretary shall send notices to all members of the Association at least thirty days before each meeting, mentioning the papers to be read and any special business to be brought before the meeting.

EXECUTIVE COMMITTEE.

XI The Executive Committee shall meet one hour before each meeting of the Association; and on other occasions when the President shall deem it necessary, upon such reasonable notice, specifying the business to be attended to, as the Committee shall, by vote, determine.

VOTING.

XII. All votes, except as herein otherwise provided, shall be *viva voce;* and in case of a tie, the presiding officer may vote.

NON-MEMBERS.

XIII. Any member, with the concurrence of the presiding officer, may admit a friend to each meeting of the Association; but such person shall not take any part in the discussion, unless permitted by the meeting.

READING OF PAPERS.

XIV. All papers read at the meetings of the Association must relate to matters connected with the objects of the Association, and must be approved by the Executive Committee before being read, unless notice of the same shall have been previously given to the Secretary, as hereinbefore provided.

PAPERS, DRAWINGS AND MODELS.

XV. All papers, drawings and models submitted to the meeting of the Association shall remain the property of the owners, subject, however, to be retained by the Executive Committee for examination and use, but at the owner's risk.

FEES.

XVI. Members shall pay an admission fee of twenty-five dollars, and annual dues of twenty-five dollars, payable in advance. The Executive Committee shall have no power to expend, for any purpose whatever, an amount exceeding that received, as hereinbefore provided for. It shall be the duty of the members to make such returns to the Secretary as shall be required by the Executive Committee.

ARREARS.

XVII. No member whose annual payment shall be in arrears shall be entitled to vote.

WITHDRAWAL.

XVIII. Any member may retire from membership by giving written notice to that effect to the Secretary, and the payment of all annual dues to that date, but shall remain a member, and liable to the payment of annual dues until such payments are made, except as hereinafter provided.

EXPULSION.

XIX. A member may be expelled from the Association by ballot of two-thirds of the members voting at any regular meeting of the Association, upon the written recommendation of the Executive Committee.

RULES OF ORDER.

XX. All rules not provided for in these By-Laws shall be those found in Roberts' Rules of Order.

AMENDMENT.

XXI. All propositions for adding to or altering any of these By-Laws shall be laid before the Executive Committee, which shall bring them before the next regular meeting of the Association, if it shall think fit; and it shall be the duty of the Committee to do so, on the request, in writing, of any five members of the Association.

COPIES OF CONSTITUTION AND BY-LAWS.

XXII. Each member of the Association shall be furnished by the Secretary with a copy of the Constitution and By-Laws of the Association, and also a list of the members.

LIST OF MEMBERS

AND THEIR OFFICERS,

NOVEMBER FIRST, 1898.

(Arranged Alphabetically According to Cities)

Note.—"Clerk," as used in the following list, is equivalent to "Secretary"—this being a custom peculiar to the Eastern States.

Akron, O., Akron St. Ry. and Illuminating Co.

Pres., Samuel Thomas; Vice-Pres., George W. Crouse; Sec., J. A. Long; Treas., A. O. Beebe; Gen. Man., W. D. Chapman; Elec., P. J. Boucher.

Allentown, Pa., Allentown and Lehigh Valley Traction Co.

Pres., Albert L. Johnson; Sec., Treas. and Gen. Man., A. F. Walter; Supt., James Uhl.

Alton, Ill., Alton Ry. and Illuminating Co.

Pres. and Treas., Joseph F. Porter; Vice-Pres., H. C. Priest; Sec., H. S. Baker, Jr.; Chief Eng. and Master Mech., James T. King; Supt. Lighting, J. H. Hopkins.

Anderson, Ind., Union Traction Co.

Pres., Philip Matter; Vice-Pres., J. A. Van Osdol; Sec., Ellis C. Carpenter; Treas., John L. Forkner; Gen. Man., Chas. L. Henry; Elec., Charles Berry.

Atlanta, Ga., Atlanta Consolidated St. Ry. Co.

Pres. and Gen. Man., Ernest Woodruff; Vice-Pres., J. C. Payne; Sec., T. K. Glenn; Treas., R. J. Lowry; Aud., A. J. Chapman; Supt., H. N. Hurt; Elec. Eng., N. W. L. Brown.

Atlanta, Ga., Atlanta Ry. Co.

Pres., Martin F. Amorous; Vice-Pres., Jacob Haas; Sec. and Treas., S. H. Bennett; Supt., Pur. Agent and Elec., Frank M. Zimmerman.

Augusta, Ga., Augusta Ry. and Electric Co.

Pres., Daniel B. Dyer; Vice-Pres., Roland R. Conklin; Gen. Supt. and Elec., William E. Moore.

Baltimore, Md., Baltimore City Passenger Ry. Co.

Pres., Walter S. Franklin; Vice-Pres., E. Austin Jenkins; Sec., Henry P. Smith; Treas., A. B. Clark; Gen. Man., F. L. Hart; Elec., J. H. Gibson.

Baltimore, Md., Baltimore Consolidated Ry. Co.

Pres., Nelson Perin; Vice-Pres. and Gen. Man., William A. House; Sec., Thomas C. Jenkins; Treas., Frank S. Hambleton; Aud., H. C. McJilton; Supt., W. C. Ludwig; Elec., P. O. Keilholtz.

Bay City, Mich., Bay Cities Consolidated Ry. Co.

Pres., William B. McKinley; Vice-Pres., Richard S. Hunter; Sec., C. C. Rush; Treas., H. H. Norrington; Gen. Man., Samuel L. Nelson; Asst. Gen. Man., W. R. Morrison; Supt. and Elec., R. S. Ashe.

Binghamton, N. Y., Binghamton R. R. Co.

Pres., G. Tracy Rogers; Vice-Pres., J. B. Lanfield; Sec., J. M. Johnson; Treas., John B. Rogers; Gen. Man. and Purch. Agt., J. P. E. Clark; Elec., C. D. Brown.

Birmingham, Ala., Birmingham Ry. and Elec. Co.

Pres., A. M. Shook; 1st Vice-Pres. and Gen. Man., Robert Jemison; 2d Vice-Pres., William A. Walker; Sec. and Treas., J. P. Ross; Supt., John B. McClary; Elec. Supt., George H. Harris.

Boston, Mass., Boston Elevated Ry. Co.

Pres., William A. Gaston; Vice-Pres., William A. Bancroft; 2d Vice-Pres., Charles S. Sergeant; Clerk, John T. Burnett; Treas., William Hooper; Auditor, Henry L. Wilson; Elec., R. W. Conant; Supt. of Transportation, Julius E. Rugg; Supt. Motive Power, Charles F. Baker; Chief Eng. Elevated Lines, George A. Kimball.

Bridgeport, Conn., Bridgeport Traction Co.

Pres. and Gen. Man., Andrew Radel; Vice-Pres., Henry M. Doremus; Sec., Thomas L. Watson; Treas., William Scheerer; Aud., E. D. Hinman; Gen. Supt., James Butler; Elec., F. E. Fischer.

Bridgewater, Mass., Brockton, Bridgewater and Taunton St. Ry. Co.

Pres., John J. Whipple; Clerk, William Jones; Treas., George A. Butman; Gen. Man. and Purch. Agt., James F. Shaw; Supt., A. C. Ralph; Elec., William H. Wadsworth; Chief Eng. of Power Station, J. C. Palmer.

Brockton, Mass., Brockton St. Ry. Co.

Pres. and Clerk, Alfred A. Glasier; Vice-Pres., George H. Campbell; Treas. and Asst. Clerk, W. F. Pope; Gen. Man., Horace B. Rogers; Asst. Treas., Henry E. Reynolds; Auditor, G. E. Tripp.

Brookfield, Mass., Warren, Brookfield and Spencer St. Ry. Co.

Pres., N. Sumner Myrick; Sec. and Treas., George A. Butman; Supt., C. A. Jefts.

Buffalo, N. Y., Buffalo Ry. Co.

Pres., Henry M. Watson; Vice-Pres. and Gen. Man., Hardin H. Littell; Sec. and Treas., Joseph S. Baecher; Aud., George E. Shaw; Supt., Richard E. Danforth; Mast. Mech., Robert Dunning; Elec., Thomas E. Henning.

Buffalo, N. Y., Buffalo Traction Co.

Pres., Edwin G. S. Miller; Vice-Pres., Robert R. Hefford; Sec., Herbert P. Bissell; Treas. and Gen. Man., Joseph B. Mayer; Supt., George Chambers; Elec., C. W. Ricker.

Butte, Montana, Butte Consolidated Ry. Co.

Pres., William A. Clark; Vice-Pres., William L. Hoge; Sec., Arthur H. Wathey; Treas., Alexander J. Johnston; Gen. Man., Jesse R. Wharton; Supt., Jesse S. Wathey; Elec., George Whitcomb.

Camden, N. J., Camden, Gloucester and Woodbury Ry. Co.

Pres., J. Willard Morgan; Sec., Thomas P. Curley; Treas., William J. Thompson; Supt., William H. Wilson; Elec., William Clyde.

Camden, N. J., Camden and Suburban Ry. Co.

Pres., William S. Scull; Vice-Pres., Benjamin C. Reeve; Sec., Samuel T. Corliss; Treas., Heulings Lippincott; Gen. Man., W. E. Harrington.

Charleston, S. C., Charleston City Ry. Co.

Pres., John G. McCullough; Sec. and Treas., F. D. McEowen; Gen. Supt., Theodore W. Passailaigue; Aud., Pinckney J. Balaguer; Elec., W. W. Fuller.

Chester, Pa., Chester Traction Co.

Pres., George B. Lindsay; Sec. and Treas., H. T. Walter; Gen. Man., John MacFayden; Elec., A. MacDowell.

Chicago, Ill., Calumet Electric St. Ry. Co.

Pres., John Farson; Sec. and Treas., H. B. White; Gen. Man., H. M. Sloan; Aud. J. J. Williams; Elec., W. A. Harding.

Chicago, Ill., Chicago City Ry. Co.

Pres., M. K. Bowen; 1st Vice-Pres., W. B. Walker; 2d Vice-Pres., Joseph Leiter; Sec., Frank R. Greene; Treas., T. C. Penington; Aud., John F. Johnson; Supt., George O. Nagle; Asst. Supt., A. C. Heidelberg; Elec. Eng., George W. Knox; Supt. of Motive Power, C. J. Reilly; Mast. Mech., Charles E. Moore.

Chicago, Ill., North Chicago St. R. R. Co.

Pres., Charles T. Yerkes; 1st Vice-Pres. and Aud., Warren F. Furbeck; 2d Vice-Pres. and Gen. Man., John M. Roach; Sec. and Treas., J. Charles Moore; Supt., T. A. Henderson; Elec., J. R. Chapman.

Chicago, Ill., South Chicago City Ry. Co.

Pres., D. F. Cameron; Vice-Pres., D. M. Cummings; Sec., Treas. and Purch. Agt., O. S. Gaither; Supt., William Walmsley.

Chicago, Ill., West Chicago St. R. R. Co.

Pres., Charles T. Yerkes; 1st Vice-Pres. and Gen. Man., John M. Roach; 2d Vice-Pres. and Asst. Gen. Man., George A. Yuille; Sec. and Treas., Louis S. Owsley; Gen. Supt., F. L. Fuller; Elec., J. R. Chapman; Elec. Supt., W. Frank Carr.

Cincinnati, O., Cincinnati St. Ry. Co.

Pres. and Gen. Man., John Kilgour; Sec. and Asst. Gen. Man., James A. Collins; Treas., Robert A. Dunlap; Aud., William R. Avery; Gen. Supt., John Harris; Elec. Eng., Bayard L. Kilgour; Mech. Eng., Bert L. Baldwin; Eng. of Roadway, F. Reid Weizenecker; Pur. Agent, Alonzo G. Starr; Master Car Builder, Patrick Leen.

Cleveland, O., Akron, Bedford and Cleveland R. R. Co.

Pres., Henry A. Everett; Vice-Pres., Charles W. Wason; Sec., Fred S. Barton; Treas., E. W. Moore; Supt., Louis E. Beilstein; Elec., L. M. Sheldon.

Cleveland, O., Cleveland City Ry. Co.

Pres., Mark A. Hanna; Vice-Pres., C. F. Emery; Sec. and Treas., J. B. Hanna; Supt., George G. Mulhern.

Cleveland, O., Cleveland Electric Ry. Co.

Pres., Horace E. Andrews; Vice-Pres., James Parmelee; Sec., R. A. Harman; Treas., John F. Whitelaw; Asst. Sec. and Treas., Henry J. Davies; Man., John J. Stanley; Aud., William G. McDole; Elec., E. J. Cook.

Colorado Springs, Col., Colorado Springs Rapid Transit Ry. Co.

Pres., F. L. Martin; Vice-Pres., E. J. Eaton; Sec., Treas. and Gen. Man., A. L. Lawton; Supt., Elec. and Pur. Agent, D. L. Macaffree; Asst. Supt., F. C. Lawton.

Columbus, O., Columbus St. Ry. Co.

Pres., Robert E. Sheldon; Vice-Pres. and Treas., Edward K. Stewart; Sec. and Aud., Philander V. Burington; Gen. Supt., Willis F. Kelly; Elec. Eng., Michael S. Hopkins.

Council Bluffs, Ia., Omaha and Council Bluffs Ry. and Bridge Co.

Pres., N. W. Wells; Vice-Pres., J. J. Brown; Sec., C. T. Stewart; Treas., J. H. Millard; Gen. Supt. and Aud., W. S. Dimmock; Elec., Israel Lovett; Mast Mech., W. B. Tarkington.

Covington, Ky., South Covington and Cincinnati St. Ry. Co.

Pres., James C. Ernst; Vice-Pres., George W. Hamilton; Sec. and Treas., George M. Abbott; Gen. Supt., Thomas M. Jenkins.

Davenport, Ia., Tri-City Ry. Co.

Pres., E. E. Cook; Vice-Pres., Frederick C. Denkmann; Sec. and Treas., James F. Lardner; Gen. Supt., John G. Huntoon; Elec. Eng., John D. Fish; Chief Eng., Thomas Gowling.

Dayton, O., People's Ry. Co.

Pres., John A. McMahon; Vice-Pres., Ezra Bimm; Sec., Eugene Wuichet; Treas., Joseph W. Wayne; Gen. Man., George B. Kerper; Supt., Nelson Routzahn; Elec. Supt., John Clark; Elec., John Cook.

Denver, Col., Denver City R. R. Co.

Pres., George H. Holt; Sec. and Treas., G. D. L'huillier; Gen. Man., Edward C. Baggs; Eng., W. F. Smith.

Denver, Col., Denver Consolidated Tramway Co.

Pres., Rodney Curtis; Vice-Pres., William N. Byers; Sec., William G. Evans; Treas., George E. Ross-Lewin; Aud., Nye C. Jelliff; Gen. Supt., Charles K. Durbin; Pur. Agent, C. F. Musgrove; Elec., A. M. Ballou.

Derby, Conn., Derby Street Ry. Co.

Pres., H. Holton Wood; Vice-Pres. and Treas., Charles E. Clark; Sec., F. W. Wallace; Gen. Man., B. W. Porter; Asst. to Pres., William J. Clark; Supt., G. N. Kennedy; Elec., George Fosdick.

Des Moines, Ia., Des Moines City Ry. Co.

Pres., J. S. Polk; Vice-Pres., George M. Hippee; Sec., A. G. Maish; Treas. and Gen. Man., George B. Hippee; Supt., W. G. Owens; Chief Eng. and Mast. Mech., J. S. Goodvell.

Detroit, Mich., Detroit Citizens' St. Ry. Co.

Pres., Tom L. Johnson; Vice-Pres. and Treas., Jere C. Hutchins; Sec., Albert E. Peters; Gen. Man., Antoine B. du Pont; Gen. Supt., John Grant; Aud., Irwin Fullerton; Mech. Eng., Thomas Farmer, Jr.; Mast. Mech., Charles Remelius.

Detroit, Mich., Wyandotte and Detroit River Ry. Co.

Pres., Charles M. Swift; Sec., Luther S. Trowbridge; Treas., Robert J. McKinney; Gen. Man., Strathearn Hendrie; Supt., Robert Dick.

Duluth, Minn., Duluth St. Ry. Co.

Receiver, Luther Mendenhall; Gen. Man., Herbert Warren; Aud., S. L. Reichert; Eng., Mathew Noble.

Elmira, N. Y., Elmira and Horseheads Ry. Co.

Pres., George W. Young; Sec. and Treas., J. M. Diven; Gen. Man., J. Blake Cahoon; Aud., H. E. Babcock; Elec., Francis G. Maloney; Elec., Ernest Goodwin.

Evansville, Ind., Evansville St. R. R. Co.

Pres., office vacant; Vice-Pres. and Gen. Man., H. D. Moran; Sec., James A. Kerr; Treas., Thomas S. Krutz; Supt., John Cash; Elec. Eng., A. H. Mann.

Fall River, Mass., Globe St. Ry. Co.

Pres. and Gen. Man., Robert S. Goff; Clerk, Marcus G. B. Swift; Treas., Herbert H. Read; Gen. Supt., John H. Bowker; Elec. Eng., George W. Palmer, Jr.

Findlay, O., Findlay St. Ry. Co.

Pres., George B. Kerper; Vice-Pres. and Treas., C. D. Kinney; Sec., J. A. Bope; Supt., Charles F. Smith; Elec., William Twining.

Galveston, Tex., Galveston City R. R. Co.

Receiver, R. B. Baer; Vice-Pres., Julius Runge; Sec., A. Drouilhet; Treas., Joseph Lobit; Supt. and Eng., F. W. Fratt.

Girardville, Pa., Schuylkill Traction Co.

Pres., Dallas Sanders; Sec. and Treas., John A. Johann; Gen. Man., E. W. Ash.

Gloucester, Mass., Gloucester St. Ry. Co.

Pres., Willard B. Ferguson; Sec. and Treas., David S. Presson; Supt., Herbert E. Reed; Elec., Frank W. Nason.

Grand Rapids, Mich., Consolidated St. Ry. Co.

Pres., Gen. Man. and Pur. Agent, G. S. Johnson; Vice-Pres., V. Shaw Kennedy; Sec. and Treas., O. S. Gaither; Supt., D. Campbell; Elec. Eng., F. L. Stevenson.

Great Falls, Montana, Great Falls St. Ry Co.

Receiver and Supt., Wallace D. Dickinson; Pres., A. S. Bigelow; Vice-Pres., L. Lewishon; Sec. and Treas., George L. Nelson.

Hamilton, Ont., Hamilton St. Ry. Co.

Pres., William Gibson; Vice-Pres., Edward Martin; Sec., Treas. and Gen. Man., J. B. Griffith; Acct., G. D. Fearman; Elec. Eng., V. H. Waggoner.

Harrisburg, Pa., Harrisburg Traction Co.

Pres., E. C. Felton; Vice-Pres., B. F. Myers; Sec. and Treas., William J. Calder; Supt., Frank B. Musser.

Hartford, Conn., Hartford St. Ry. Co.

Pres., E. S. Goodrich; Vice-Pres., Samuel G. Dunham; Sec. and Treas., Daniel R. Howe; Gen. Man., Norman McD. Crawford; Aud., W. L. Robb; Supt., Frank Caum.

Hazleton, Pa., Lehigh Traction Co.

Pres., C. W. Kline; Vice-Pres., John G. Saeger; Sec., E. S. Doud; Treas., N. C. Yost; Gen. Man., A. Markle; Supt., George W. Thompson; Elec. Eng., C. A. B. Houck.

Hoboken, N. J., North Hudson County Ry. Co.

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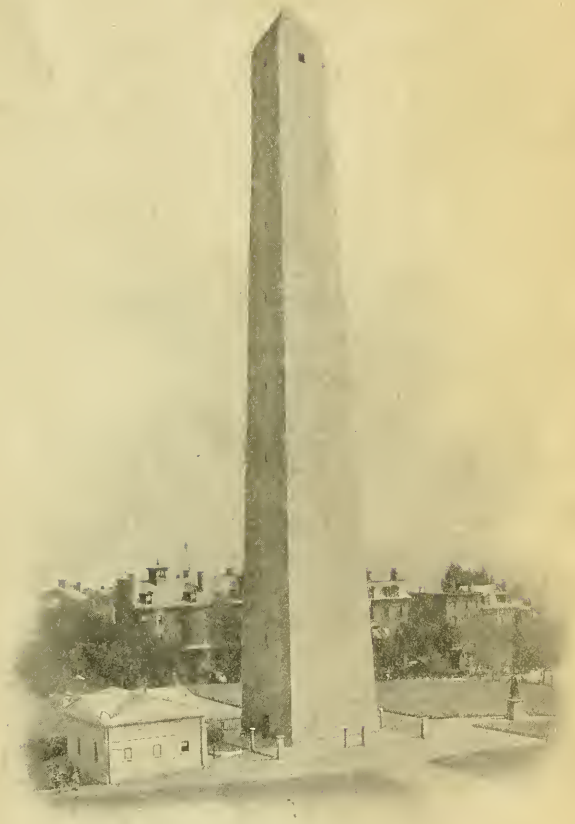

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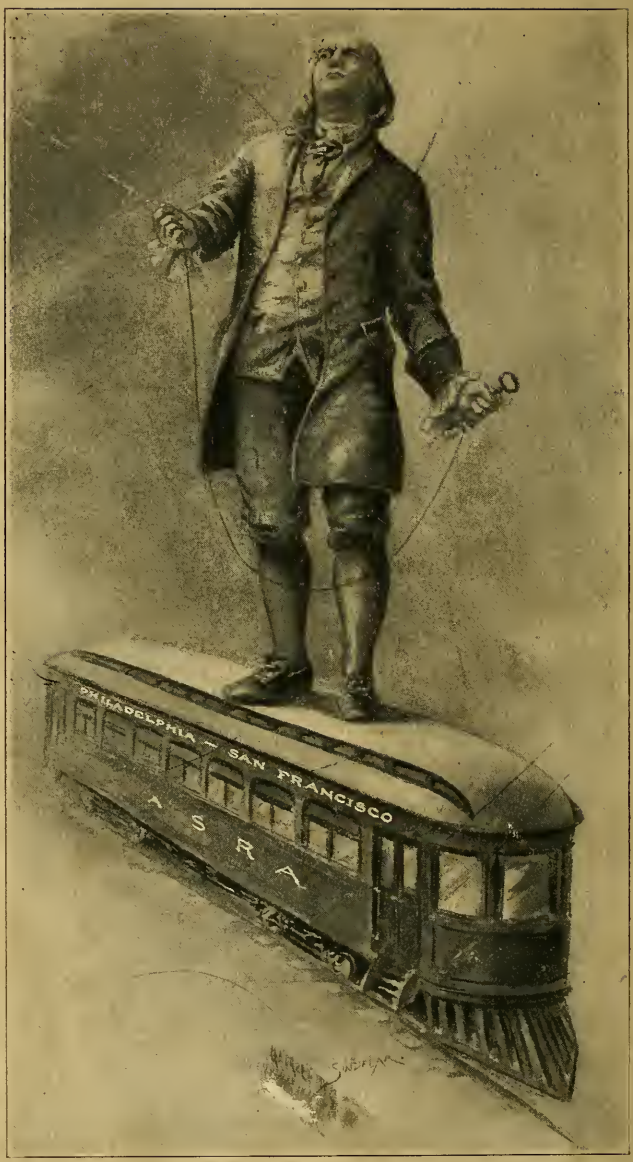
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